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MODEL AIRPLANE NEWS

ULY
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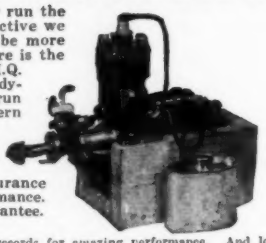
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We give you 10 days time to inspect all parts and actually run the motor. If at the end of that period you find any part defective we shall be glad to replace it free of charge. Can anything be more fair? Never before was such an open offer ever made. Here is the reason we are able to offer this unusual guarantee. The G.H.Q. motor is the result of years of exhaustive, scientific, aerodynamic research. Every motor is given a gruelling test and run before shipped to you. We have spared no expense in modern factory production so that we may be certain of one thing—that each motor is uniform in every respect. Our tremendous output (thousands of motors have already been bought) together with the fact that we are one of the largest concerns of its kind in the model airplane field, is your assurance that each G.H.Q. motor conforms to its high standard of performance. That is why we are able to offer this broad unconditional guarantee.



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It is the modern miniature motor designed exactly as present day real motors that has broken records for amazing performance. And look at the reason! In many cases we could have saved considerable money using inferior parts. Examine each part closely. Look at the life-time high-speed bronze connecting rod—and the crank shaft 5/16" thick as compared to other motors selling at twice the price having a thickness of only 3/16". Then, too, G.H.Q. has one of the largest crank-shafts of any motor—as well as the fool-proof long life timer.

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The G.H.Q. Motor is priced especially low so that you may deal direct with our factory. Even though dealers have asked to handle this product, we have not been able to give them a special dealer's price. This famous motor, complete, entirely assembled on stand, tested and run before shipment, performance guaranteed. No oil, gas or batteries included. Postpaid for only $12.50. Free—one finished fly-wheel mounted on motor with every finished motor..... **$12.50**

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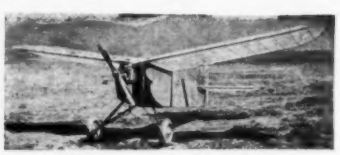
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G. H. Q. SCORES AGAIN!

April issue of Modern Mechanix contained the following editorial

Gasoline powered airplane models are finding great favor with aviation fans and a $3 prize was awarded to Francis Kosanda, of Hopkins, Minn., for his interesting letter:



Francis Kosanda, of Hopkins, Minn., holds gasoline powered model he and Robert Apgar constructed. On its initial flight, the 9-foot model flew out of sight but was recovered again.

Dear Editor: **Hopkins, Minn.**

Enclosed is a photo of a gas powered model airplane built by Robert Apgar, of Minneapolis, and myself. It is of original design and powered with a G. H. Q. motor.

The model weighs five and one-half pounds, has a wing span of nine feet, and an aspect ratio of 8-1. On a test flight the model went out of sight after ten minutes, but was later recovered from a tree overhanging the Mississippi River.

Your articles on gas engines, gas models, and model airplanes are excellent. **Francis Kosanda.**

Judging from the report, the gas model must be an excellent cloud chaser and we are glad it was recovered without serious damage.

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These are the giant models that have amazed the model builders of America. Imagine strong outdoor flyers that are actually one-third the size of passenger carrying planes—a $10 value for only $1.00. Everything is in the kit including all liquids—nothing else to buy!

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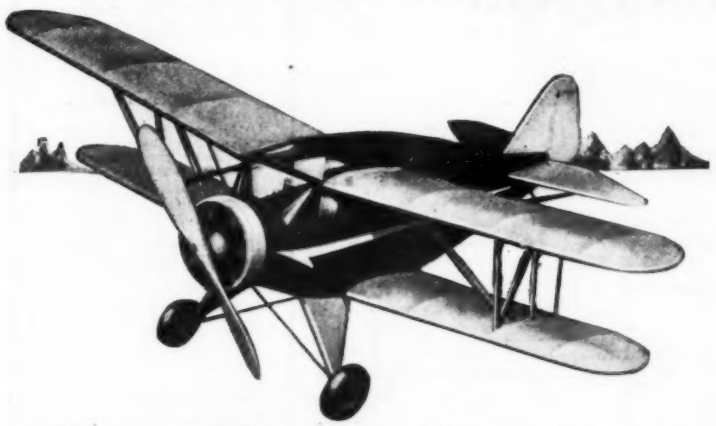
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Model AIRPLANE News

8th YEAR OF PUBLICATION

VOL. XVII *No. 1*

Edited by Charles Hampson Grant

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In Our Next Big Issue

Torpedo Bombers of the U.S. Navy, by Gordon Sear Williams, tells you of interesting features of one of the most important weapons of naval aviation.

How to Adjust Outdoor Models, by Vernon Boehle, gives some "pointers" that will help model fliers who enter contests.

Building a Record R.O.W. Fuselage Model, by Alan Orthof, shows you how to create a "hydro" that will make vacation days more enjoyable.

How to Build a Flying Burnelli Transport, by Alan D. Booton and Ralph Pickard, shows how you can have one of the most unique flying models ever to take the air.

Complete Detail Plans of a Model "F-50" Cyclone Engine, by William Wylam, which will fit into the scale model Hawk "III-C." Don't miss this.

Also a 300 sq. in. wing area gas job that will go places, by Thracey Petrides and Malcolm Abzug.

There will be other unique and fascinating articles as, **Building "Little Tick,"** a timer for gas models; **An Experimental Flier for Novice or Expert, Model Builders Hall of Fame, Designing Your Model for Duration, "Gas Lines," Air Ways, Frontiers of Aviation, N.A.A. News, Aviation Advisory Board,** and interesting short items.

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"THE BIGGEST NAME IN LITTLE ENGINES"

Get Your Share of $300 Cash Prizes



The Only Proven Engine $17.25 Complete

Again this year Major C. C. Moseley, president of Aircraft Industries posts $300 with the Los Angeles Chamber of Commerce as prize money in the 1937 National Championship Model Airplane Meet, June 30, July 1, 2 and 3. $150 goes to the contestant between 16 and 21, $150 to the contestant over 21 years of age whose Baby Cyclone powered model takes first place in the Gasoline Powered contest for cabin r.o.g. models. Watch for N. A. A. announcement of the place.

"BABY CYCLONE" is the only miniature power plant using the superior rotary valve principle—same as the famous outboard motorboat racing engines. Develops 25% more power than the conventional 2-stroke engines. Two strictly stock Model D Baby Cyclones proved their unbeatable stamina and long life by running wide open for more than 100 hours with a perfect score. You can depend on your Baby Cyclone every time!

Extra Special Kit Combination Offer No. 1

Fly the "CALIFORNIA CHAMPION"—state meet record holder. A high wing, open cockpit job for experienced builders. Designed for Baby Cyclone Engine. Silk covered sides and wings; balsa tail assembly, metal cowl, balloon tires. Wing span 5 feet, length 45 inches overall, height 15 feet. Weighs 3 lbs. with engine. Kit complete with all parts; silk covering, dope, cement, etc., and full size scale drawing with simple instructions. Combination offer includes 13½" hardwood propeller and Model D Engine.



Engine . . $17.25
Kit $10.00
Prop . . . $ 1.50

Reg. Price $28.75
ALL FOR
$22.50
Post Paid U. S. A.

Extra Special Kit Combination Offer No. 2

The "CALIFORNIA CHIEF" is a famous kit of simple design for inexperienced builders. A high wing model especially designed for Baby Cyclone Engine. Completed plane has a wing span of 61 inches. Weight 2¼ lbs. with engine, ready to fly. Kit complete with all parts; covering, dope, cement, etc., and full size scale drawing with simple instructions for assembling. Combination offer includes 13½ inch hardwood propeller and Model D Baby Cyclone Engine.



Engine . . $17.25
Kit . . . . $ 7.90
Prop . . . . $ 1.50

Reg. Price $26.65
ALL FOR
$20.50
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Major C. C. Moseley, Pres., Aircraft Industries, Grand Central Air Terminal, Glendale, Calif.:
Please send me postpaid the following items checked. I enclose P. O. Money Order.

Calif. Champ Combination inc. kit, propeller and engine..$22.50	Calif. Chief Combination inc. kit, propeller, engine.....$20.50	Model D Baby Cyclone Engine, complete$17.25	California Champion Kit only $10	California Chief Kit only . . $7.90	Hardwood Propeller only . . $1.50

ORDER TODAY

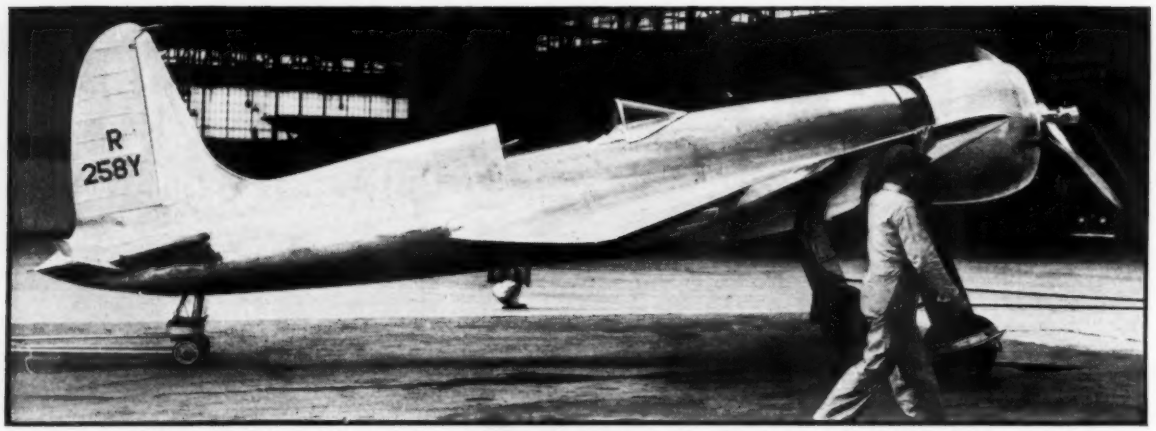
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Howard Hughes' sleek racer that tore across the country at the rate of 352 m.p.h. (International)

So You Want to Break a Record?

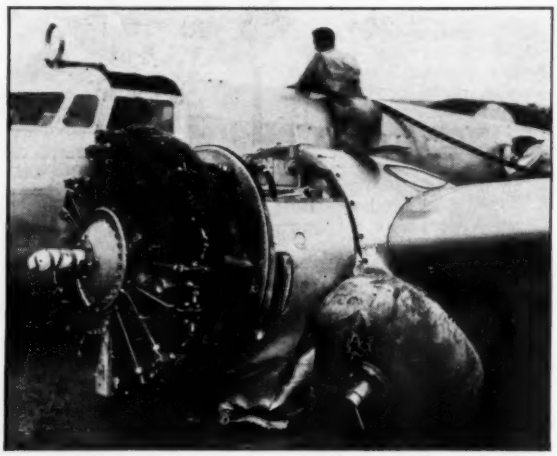
Why a Feat Which Apparently Is Very Simple Is Actually Extremely Difficult to Perform With Any Degree of Success

LIEUT. H. B. MILLER

SO YOU want to break a record? You think it would be lots of fun flying across the United States to land at Floyd Bennett with a speed record hanging from your belt? The whooping crowds and Broadway at your feet.

Nothing to it? That's what you think! Just climb into a nicely polished streamlined plane at Burbank and keep it headed towards the East. Then, the next morning lie in bed basking in the newspaper spread!

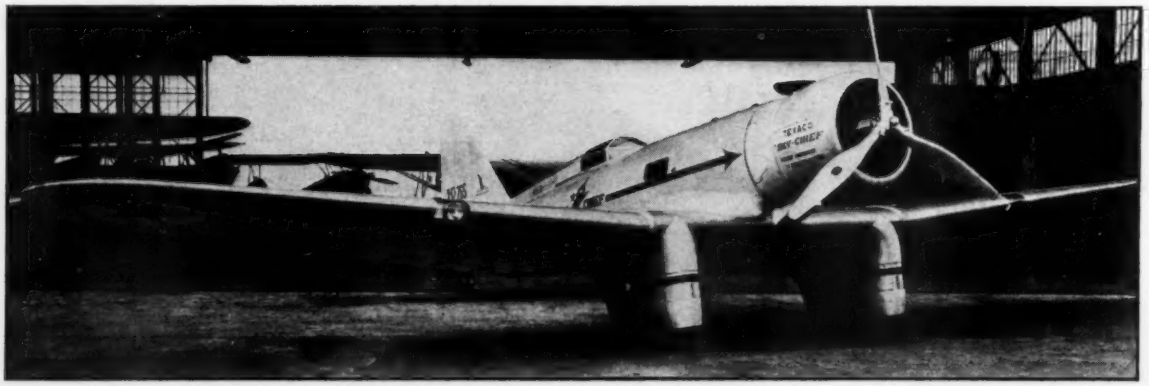
Suppose you do decide to make the flight, where are you going to get a plane with enough power to break a record? After all, there is no use starting if you haven't a reasonably good chance of success. Of the numerous airplane companies in this country, many have specialized at various times in the building of speed planes. Most of them have long since given it up as a money losing proposition.



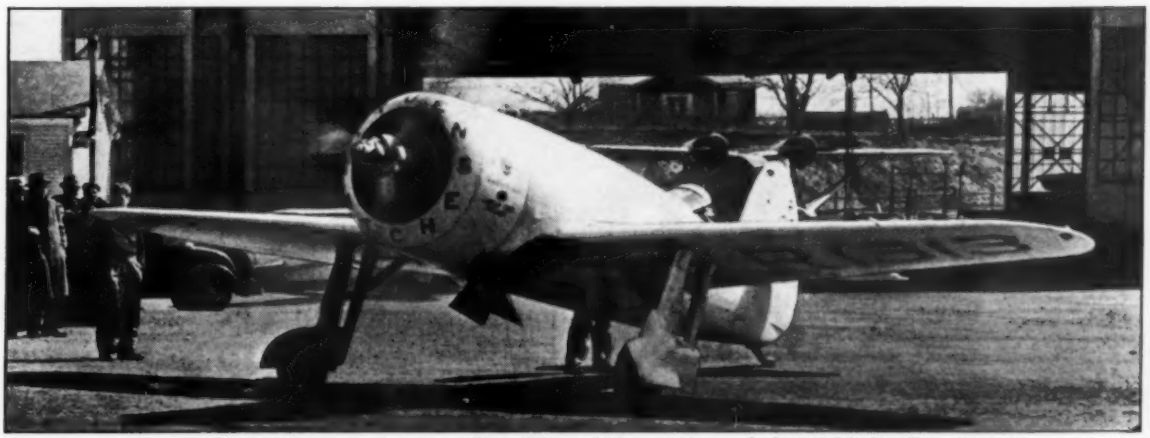
Miss Earhart's plane after its crack-up at Honolulu, P.I. (landing gears too weak.) (Acme)

Nevertheless, it is an acknowledged engineering fact, that any aviation record existing today can be broken. All that is necessary is to devote much time and considerable money to the basic engineering research. The normal methods of speeding up aircraft, such as pepping up engines and applying elementary streamlining are exhausted. Today it is a problem of retractable landing gear, mathematically perfect fillets, superfine fairings, and much expensive tunnel testing. These factors are requisite in any plane capable of breaking speed records.

How about cash? Do you have a Santa Claus hidden away in some dark corner? In the old days it was customary for a budding aviator to let himself be discovered by a kindly influential gentleman who, by chance, happened to be director in some prospering corporation—preferably an oil company, since aviation engines burn gas and oil with voracious appetites. Following Lindbergh's flight to Le Bourget, it was no trick to get a group



Capt. Hawks' famous Northrop Gamma racer with which he broke several records. (Acme)



Capt. Frank Hawks' 350 m.p.h. racer, "Time Flies" which recently cracked up while landing. (Acme)

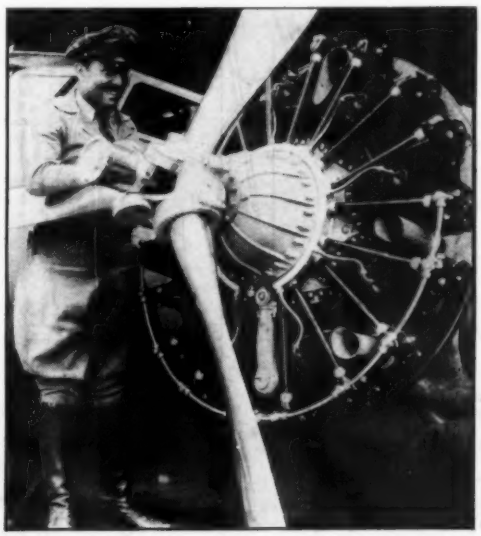
of financial men to back you, providing you promised to fly far enough.

It little mattered that aircraft of that era could not fly across the various oceans as a regular diet. What if some of the planes entered in the Dole Flight did not have sufficient fuel to enable them to reach Hawaii? Or that the crews lacked the navigating experience necessary to take them there, even if they had carried ample gasoline?

What is most amazing is that so many pilots started on these impossible flights when the slightest degree of sanity would have told them they had only the slimmest chance of ever arriving at their destination. A fortunate few cracked up on the take-off. Several returned while there was yet time. But, enough were sufficiently affected by the national hysteria to keep on going until they ran out of fuel or became lost. Whatever their fates, great numbers of them were never seen again.

Recall the case of the Montana rancher who became so animated with the spirit of aviation that he disappeared out over the stormy Atlantic in a small under-powered plane, depending upon the wind to blow him across during the last part of his flight. Or, the plight of one of the Dole entrants who had to fly around in circles just out of sight of Honolulu because his navigator was unable to get a position until the sun was directly overhead.

Today, things have changed. Most of the long treks have been done at least once. No longer is there any thrill in reading of a one-man trans-oceanic flight. John Public now insists on safety, for he himself wants to make the flights and he must take no chances.



Roscoe Turner, famous speed pilot, tuning up his motor for the London-Melbourne flight. (Acme)

If you still insist on breaking records today, you'd better dig down deep in your pocketbook. And by deep, the extreme interpretation of that word is meant. Backers are scarce. Howard Hughes has already expended over two hundred thousand dollars on his adventures in speed aviation. For this sum he recently broke the world landplane record by nearly fifty miles an hour. True, the money meant little to him, but still, it had to be placed on the altar of speed by some interested party. And, you probably need not be reminded that for this investment Hughes produced only one plane—not a stable of speed bugs.

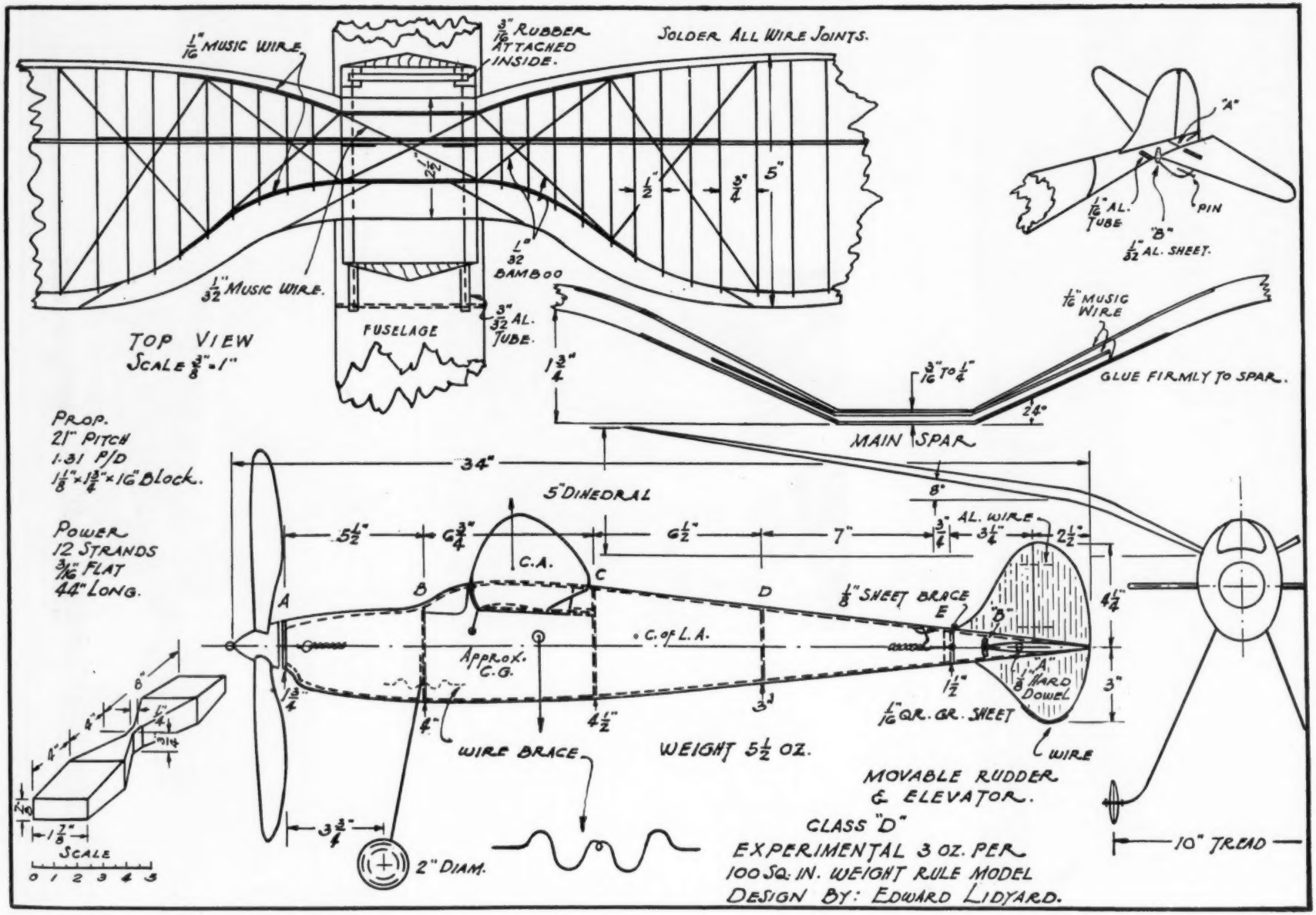
Hughes' engine could be had for $12,000, while tires and similar accessories were purchased for comparatively little. But the cost of the engineering on this little job makes the rest of it look like chicken feed. To design a plane which offers no resistance to the air—ah, there's the rub!

For argument's sake, let's assume you acquire your racer. Isn't it a beauty? But, can you fly it? Oh, you've been landing them at 60, eh? Well, how about a job that goes on from 90 to 100 miles an hour? Not much difference? Just try it once. Try to find a field large enough to enable you to practice your first few landings. Try to shoot short and find

(Continued on page 43)



Miss Earhart and her Lockheed-Electra that started on an ill-fated round-the-world flight. (Acme)


1/16" MUSIC WIRE
3/16" RUBBER ATTACHED INSIDE.
SOLDER ALL WIRE JOINTS.
1/32" MUSIC WIRE
1/2"
3/4"
5"
1/8" BAMBOO
3/32" AL. TUBE.
FUSELAGE
TOP VIEW
SCALE 3/8" = 1"
"A"
1/16" AL. TUBE
PIN
"B"
1/32" AL. SHEET.
1/16" MUSIC WIRE
GLUE FIRMLY TO SPAR.
1 3/4"
3/16" TO 1/4"
24"
MAIN SPAR
PROP.
21" PITCH
1.31 P/D
1 1/8" x 1 3/4" x 16" Block.
POWER
12 STRANDS
3/16" FLAT
44" LONG.
34"
8"
5" DIHEDRAL
5 1/2"
6 3/4"
6 1/2"
7"
3/4" AL. WIRE
3 1/4"
2 1/2"
C.A.
A
B
C
D
E
1/8" SHEET BRACE
4 1/4"
C. of L.A.
APPROX. C.G.
1 3/4"
4"
4 1/2"
3"
1/2"
1/16" QR. GR. SHEET
1/8" HARD DOWEL
WIRE BRACE
WEIGHT 5 1/2 OZ.
WIRE
MOVABLE RUDDER & ELEVATOR.
3 3/4"
2" DIAM.
10" TREAD
CLASS "D"
EXPERIMENTAL 3 OZ. PER 100 SQ. IN. WEIGHT RULE MODEL
DESIGN BY: EDWARD LIDYARD.
8"
4"
4"
1"
1/4
1/16
1 7/8"
SCALE
0 1 2 3 4 5

A New Weight Rule Contest Model

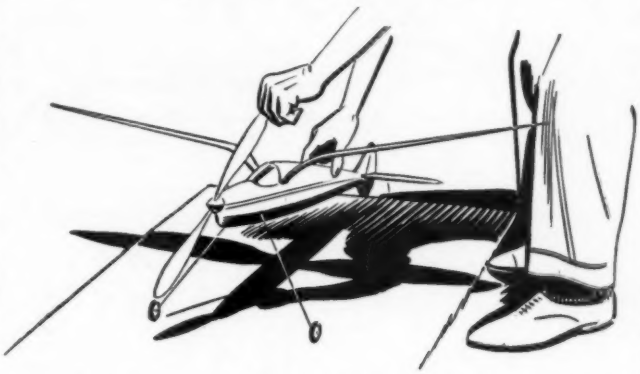
Here Are the First Complete Instructions to Build a Contest Model That Fulfills the New Contest Rules of 1½ Ounces to Every 50 Sq. Inches of Wing Area

By EDWARD J. LIDGARD

THIS summer will see the innovation of a new weight ruling. At a recent meeting of the National Aeronautic Association it was decided that the weight rule should be changed from one ounce for every fifty square inches of wing area to three ounces for every one hundred square inches. All outdoor models flown in the future N.A.A. sanctioned contests must meet this new rule.

There are several general factors that must be remembered in designing a three ounce to one hundred square inch model. (1) The added weight will make it possible to use better streamlining, which will be necessary to obtain the efficiency required to make a heavy model soar in thermal currents. (2) The weight, streamlining and powerful motors found in a model of this type will tend to make it fast, therefore it must be built to withstand much abuse and handling. (3) Inherent stability must be incorporated into the design because recovery from all displaced positions in flight will be comparatively slower than the recovery of a lighter model.

Although most models are stable about the three axes they should also be stable spirally. In the early days it was the belief that dihedral and a low center of gravity was all that was necessary for stability, but today models are faster and heavier, which brings the center of lateral area (or directional center) into play. This point is the center of all the area of a model when viewed directly from the side. The relationship of this point to the center of gravity determines its spiral stability. It must be almost in line with the C.G. When the C. of L.A. is above the C.G. (about which all reactions take place) the balance of side areas is disturbed. This makes the portion above the C.G. like the big end of a weather vane and the lower like the small end. When in a side slip or hit by a cross wind the model will bank tighter and tighter and begin losing altitude; this is a spiral dive from which there are few recoveries. The reason for this reaction is that the relative wind in a side slip or cross wind strikes the model from the side instead of due front causing this weather vane-like force to come into play. In this model the center of lateral area is as near as possible to the correct position. It was computed by cutting from cardboard of equal thickness a side view of the model, true to scale except for an oversized rudder which was then trimmed down until the cardboard image balanced at the correct predetermined position.



This shows how your finished model will look on the starting line at a contest

A little study and application of knowledge on this subject will result in better windy weather performance and all around stability, because fast heavy models will be more affected by the C. of L.A. than models of the past have been.

The design shown in accompanying plans is a new version of a model of the old weight rule which has been revamped to meet the demands of present day rules. It meets the N.A.A. weight rule and cross sectional area requirements. It may be flown in the coming National competition which will probably be held in Detroit. By changing the wing for one of similar outline but of all balsa construction and with approximately two hundred and five square inches of area, the plane may be flown in the international Wakefield, and Moffett events. However, a heavier motor and a larger propeller must be used.

With the above ideas in mind this model was designed. A hollow shell balsa fuselage was chosen because of its great strength. With this type of fuselage any desired shape may be obtained. The finished product may be given a high polish the same as a glider wing. A few features such as the cabin and the inverted motor cowling are hangovers from the old model from which the basic design has been taken. The latter has been proven through a whole season's flying, having placed on the 1936 Moffett team and proven its ability to soar by flights of 95 minutes and 15 min. 12.9 seconds, respectively. The blocks from which the fuselage is carved is of six pound wood. The shell is three thirty-seconds of an inch thick, but at the very front it tapers to three-sixteenths. The former's are of one thirty-second inch Jasco birch plywood. This material is light and strong and can "take it" better than balsa in case of rubber breakage.

The landing gear is the cantilever wire type which is flexible, yet sufficiently strong and offers little drag.

In place of a removable tail plug a three-quarter of an inch hole is left in the top rear of the fuselage to insert the rubber. Winding is done from the front by use of a winding loop on the front of the propeller; this system does away with all S hooks. NOTE the shape of the rear rubber hook.

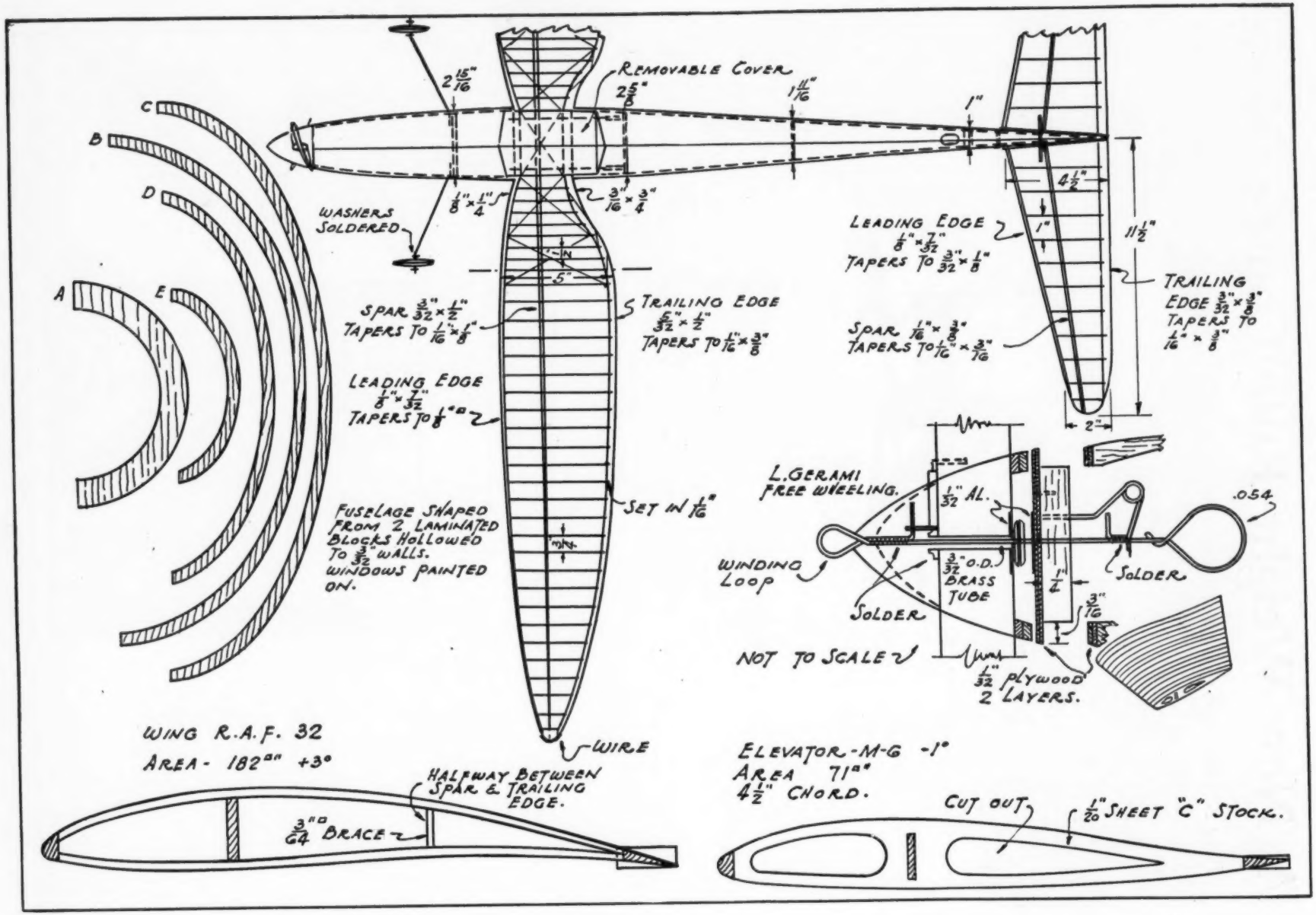
The R.A.F. 32 airfoil was chosen for the wing because of its high lift and good gliding qualities. It is also deep and will accommodate a strong spar. This section is being adopted in nearly all parts of the country and meets with favorable results. The one sixteenth inch square cut rib method of construction is used because it is light and permits the use of many ribs. By trimming one-third from the leading edge of the full size cut rib and two-thirds from the rear the desired taper may be effected. The same process is used on both the upper and lower camber strips. The airfoil section at the tip will not be an R.A.F. 32 but will be a thinner section equally well adapted for this type of model.

The wing design shown is purely experimental, the aim being to keep the drag resulting from the wing joining the fuselage at a minimum. The chord is very small at this junction, therefore the turbulence about it will be correspondingly small and there will be little disturbed air flowing

(Continued on page 50)



The author launching a model, the forerunner of the new weight rule ship described here


C
B
D
A
E
2 15/16"
REMOVABLE COVER
2 5/8"
1 11/16"
1"
WASHERS SOLDERED
1/8" x 1/4"
3/16" x 3/4"
4 1/2"
1"
11 1/2"
LEADING EDGE 1/8" x 7/32" TAPERS TO 3/32" x 1/8"
TRAILING EDGE 3/32" x 3/8" TAPERS TO 1/16" x 3/8"
SPAR 3/32" x 1/2" TAPERS TO 1/16" x 1/8"
TRAILING EDGE 6/32" x 1/2" TAPERS TO 1/16" x 3/8"
SPAR 1/16" x 3/8" TAPERS TO 1/16" x 3/16"
LEADING EDGE 1/8" x 7/32" TAPERS TO 1/8"
2"
FUSELAGE SHAPED FROM 2 LAMINATED BLOCKS HOLLOWED TO 3/32" WALLS. WINDOWS PAINTED ON.
SET IN 1/16"
L. GERAMI FREE WHEELING.
1/32" AL.
.054
WINDING LOOP
3/32" O.D. BRASS TUBE
SOLDER
SOLDER
1"
3/16"
NOT TO SCALE
1/32" PLYWOOD 2 LAYERS.
WIRE
WING R.A.F. 32
AREA - 182 sq in +3°
HALFWAY BETWEEN SPAR & TRAILING EDGE.
3/64" BRACE
ELEVATOR - M-G -1°
AREA 71 sq in
4 1/2" CHORD.
CUT OUT
1/20" SHEET "C" STOCK.

Our International Classic

How the Wakefield Cup Has Been Won and Lost and Suggestions That May Help Future Contenders

By FRANK ZAIC



The 1936 British Wakefield Team. Left to right: Allman, Fairlee, Johnson, Copeland, Greenhalgh, Jr., Smith, Jones, Jr., and Judge, the winner

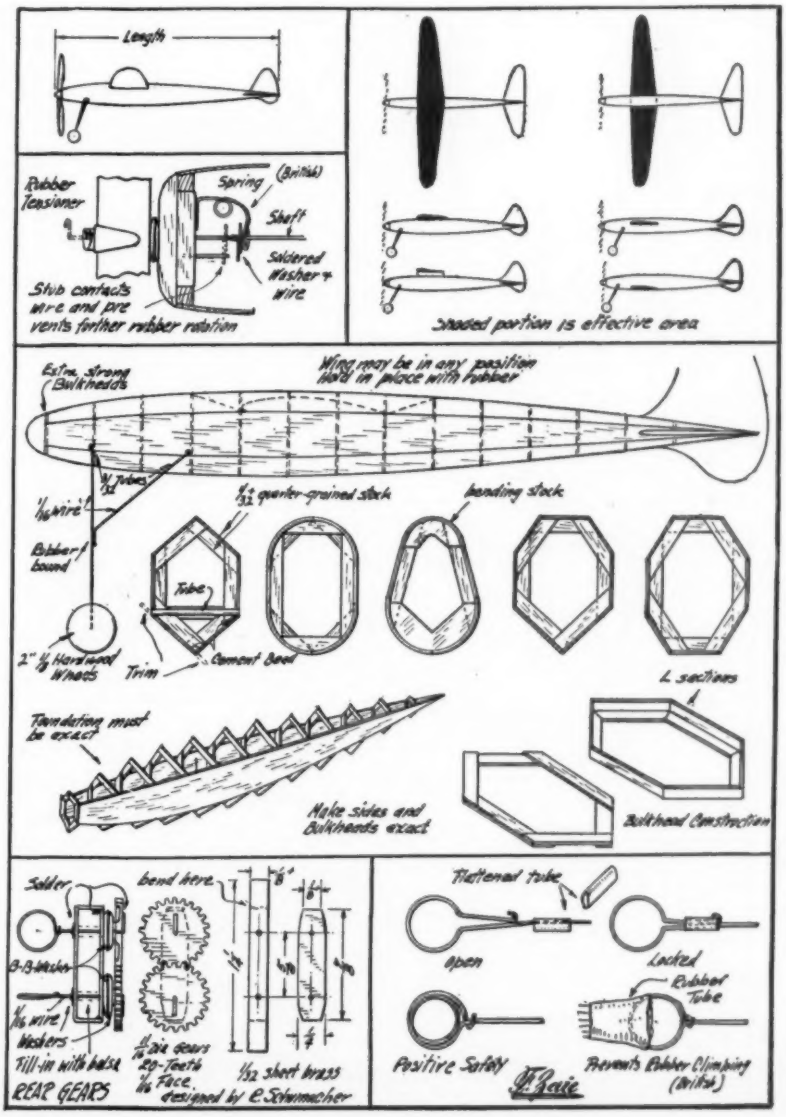
IT SEEMS like yesterday that we cried, "We'll see you in London," to the departing victorious Englishmen. We will always remember the good-will feeling as we waved away the ship that was carrying back to England the Wakefield Cup. We made a promise there and then that no matter what happened we would be in London to meet them again next year.

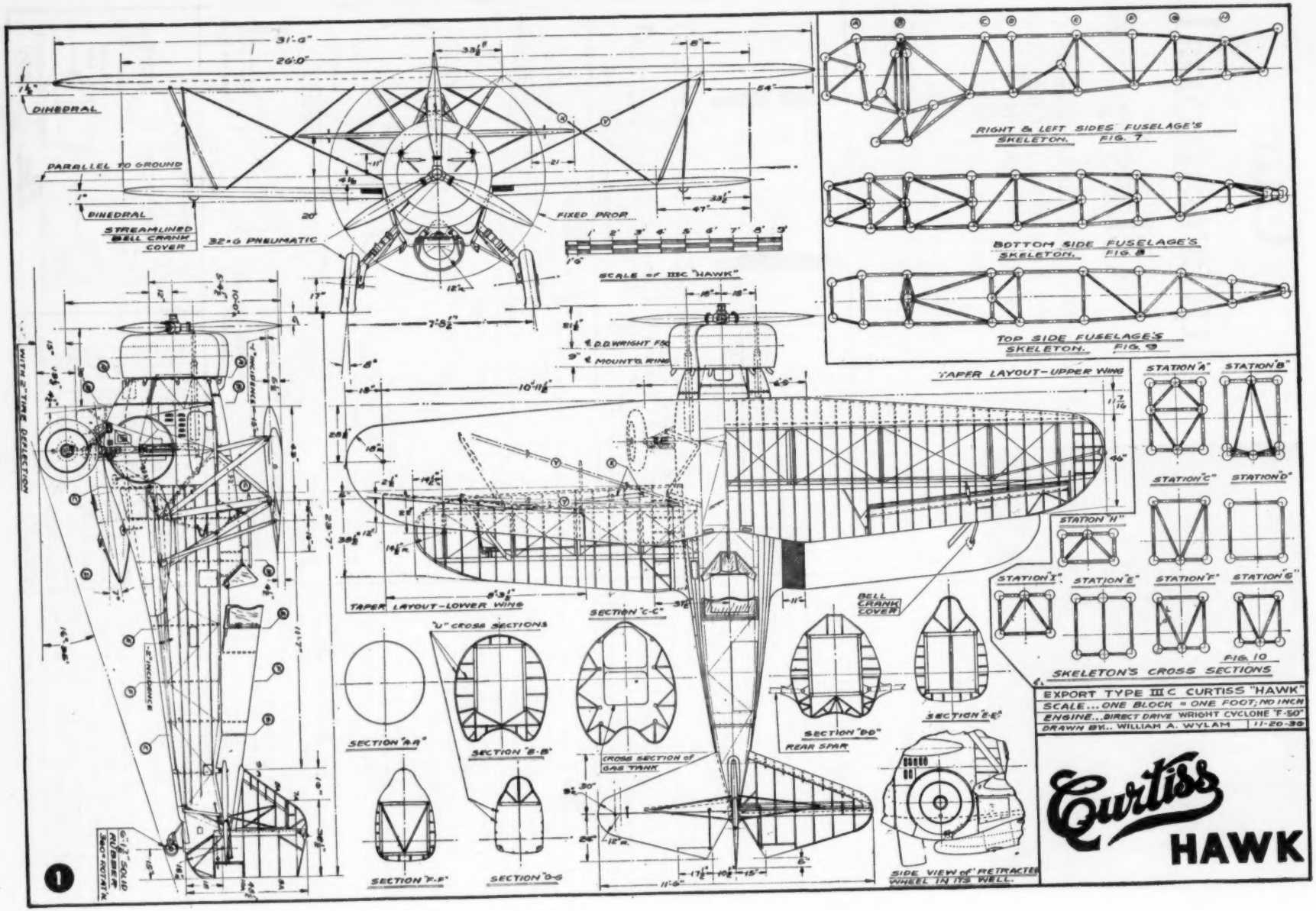
The history of the Wakefield Cup dates back to 1928 when Lord Wakefield offered his cup for international competition. The first two contests, 1928 and 1929, consisted of English boys exclusively as the model building was at a low ebb. Also, the international correspondence exchange was very small. The cup first came into prominence in the American field in 1930 when Joe Ehrhardt of St. Louis won it while he was on his European tour, a 1930 National Contest prize. He won it again at the 1931 Nationals. The contest was now fought on the American field with English representation by proxy flying. Gordon Light captured it in 1932, but this was nullified because the contest was held two months after the date agreed upon, with the consequence that the cup was sent back to England.

The 1933 competition was not at all represented by a United States team as we had another low ebb in model activity organization. However, in 1934 we sent an almost complete quota of six models to be flown by proxies, and we made a fair showing under adverse conditions by placing in several points. 1935 was our big year, made so by a spectacular out of sight flight of Gordon Light's job. His single 7 min. 30 sec. flight gave him the winning 2 min. 30 sec. average of three flights. Besides his first place, the United States team placed well in the runner-up listing. Again the cup crossed the Atlantic ocean, but it was now sailing in the western direction, much to our satisfaction.

With the cup back in the United States, we wondered what the Englishmen would do to regain it. They did plenty! Organized a national drive for financing a team of six to come to the contest in person to make sure that every model was flown by the person who knew most about it. Their elimination contest recorded the largest attendance ever held in England. That the selection of their team was good, we need but look over the 1936 contest results. Besides winning the cup back, they also placed third, fifth, and seventh. Our boys tried their best but it's the first place that really counts.

(Continued on page 51)




DIHEDRAL
PARALLEL TO GROUND
DIHEDRAL
STREAMLINED BELL CRANK COVER
32 x 6 PNEUMATIC
FIXED PROP
SCALE OF IIIC "HAWK"
RIGHT & LEFT SIDES FUSELAGE'S SKELETON. FIG. 7
BOTTOM SIDE FUSELAGE'S SKELETON. FIG. 8
TOP SIDE FUSELAGE'S SKELETON. FIG. 9
TAPER LAYOUT - UPPER WING
TAPER LAYOUT - LOWER WING
STATION "A"
STATION "B"
STATION "C"
STATION "D"
STATION "H"
STATION "I"
STATION "E"
STATION "F"
STATION "G"
FIG. 10
SKELETON'S CROSS SECTIONS
"U" CROSS SECTIONS
SECTION "A-A"
SECTION "B-B"
SECTION "C-C"
SECTION "D-D"
REAR SPAR
BELL CRANK COVER
SECTION "E-E"
SECTION "F-F"
SECTION "G-G"
CROSS SECTION of GAS TANK
SIDE VIEW of RETRACTED WHEEL IN ITS WELL.
EXPORT TYPE III C CURTISS "HAWK"
SCALE... ONE BLOCK = ONE FOOT; NO INCH
ENGINE... DIRECT DRIVE WRIGHT CYCLONE "F-50"
DRAWN BY... WILLIAM A. WYLAM | 11-20-36
Curtiss HAWK

The Hawk "III-C" In Miniature

Instructions and Plans for Building a Miniature Pursuit Ship That Will Stir the Heart of Every Scale Model Builder

By WILLIAM WYLAM



The Curtiss Hawk "III-C" pursuit plane

THE Type "III-C" Hawk is one of the latest additions to the illustrious family of Hawks—known throughout the world for its high performance and high maneuverability. With its powerful heart, namely the Wright Cyclone "F-50," it can tear through the air at a terrific rate; climb like a balloon at a fictional rate, too.

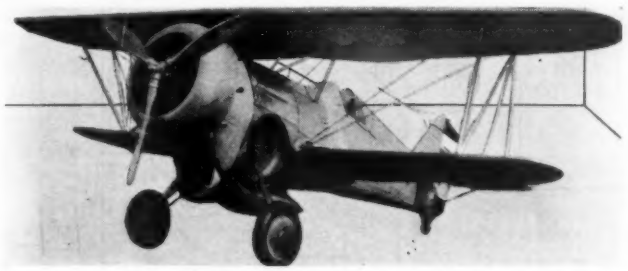
This model represents 12 years of intensive research by the engineering department of the Curtiss Airplane Division. As the years rolled by, it was constantly refined in performance, maintenance and structure; to the highest degree of perfection. No doubt, this new Hawk has established new standards of maneuverability and performance in the pursuit plane class.

General Description of the Construction
The Fuselage Structure

The fuselage is of welded steel (chrome-molybdenum) tubular construction. Attaching brackets and fittings are of sheet steel and forgings. They are welded into the fuselage structure for attaching the engine mount, wings, empennage, tail wheel unit and landing gear unit to the structure by means of bolts. All bulkheads, supports and formers are also welded onto the structure, and they are of "U" cross section, steel sheets. The fairing strips are of dural tubing and are also welded to the supports.

The fuselage, from the engine compartment to the cockpit, is cowled with large metal hinged doors, which permits easy access to all parts of the front portion of the airplane. The cowlings are made of aluminum alloy sheets, reinforced and stiffened to withstand abuses and long wear. From the cockpit to the tailpost, the fuselage is fabric covered, with the exception of the turtledeck. The turtledeck is of hinged aluminum alloy sheet cowl construction; and this provides the baggage compartment. On the front part of the turtledeck, a sliding antidraft shield is mounted which is made of transparent pyralin. The shield can be locked while in flight and can be quickly unlocked in case of emergency. The bottom of the turtledeck is of heavy canvas floor, which is easily opened for access to the inside of the fuselage. The rear of the turtledeck and under the fin is cowled with metal, which is removable for servicing purposes. Large inspection doors are provided in the covering and a door is provided at the bottom of the fuselage near the controls.

The cockpit has a full floor of aluminum alloy sheet, and the sides are lined with the same materials. They are fitted about with various controls, and are very clean and neat in appearance. The windshield is mounted on a welded super-structure of the fuselage. It is of three pieces of shatterproof glass and it is set in moulded rubber channels which protect the glass from damage. The instruments are grouped on a board, directly parallel to the vertical line, and the main center of the board is covered with leather crash pad. For night flying, the instruments are indirectly lighted and a rheostat is provided to reduce the glare or reflections. The pilot seat is made of aluminum alloy and is shaped for the use of standard seat-type parachutes. The seat height is adjustable in the air by an operating crank on the side. A cushion back is provided, which can be used as a life preserver.



Note the bomb and landing gear details

Rudder controls are of hanging type, and are made of welded steel tubing. Large aluminum brake pads are hinged to the lower end of the pedal bars. Heavy cables are attached to the sides of these pedals, passed through pullies and runs out to the rudder horn. The control stick unit is of ball bearing construction; and is bolted to the floor of the cockpit.

The aileron control is of push and pull system which is located in the lower wing; and it operates the ailerons by a strut, which is attached to a bell crank. The elevator control is a connected rod from the stick to a balanced pivot behind the pilot's seat. At the pivot, a push pull rod runs to another pivot then to the internal elevator horn. The stabilizer control in the cockpit is a crank, which is made with a recording dial, which shows the number of degrees of the stabilizer's nose position. It is connected to the crank and screw post by means of an endless chain. The elevator's flettners are hinged to the elevator's frame and are connected by a rod to a stiff horn, fixed to the stabilizer's frame. The rudder's flettner is adjustable from the cockpit by means of a spinning wheel and an endless chain.

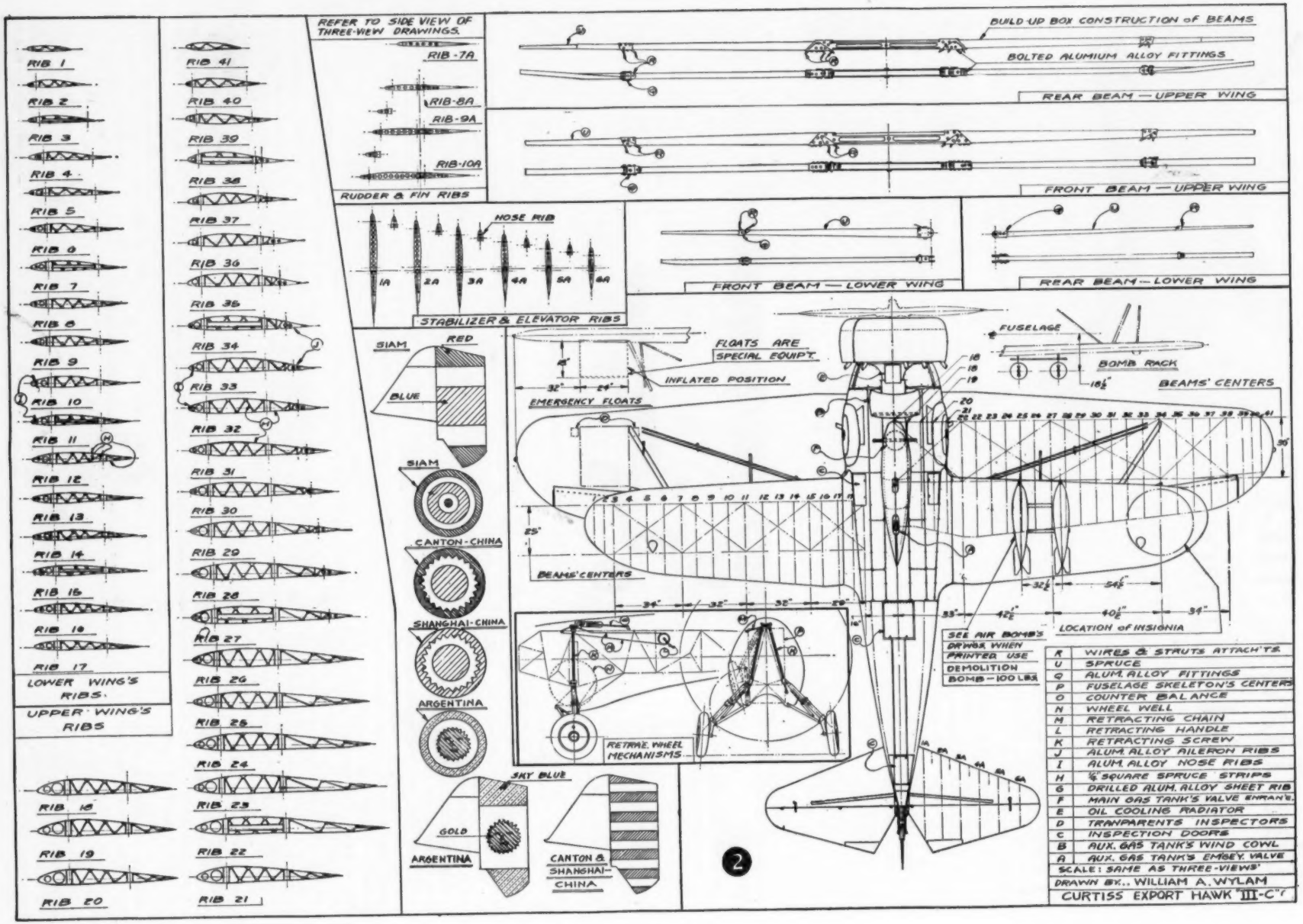
Wing Cellule

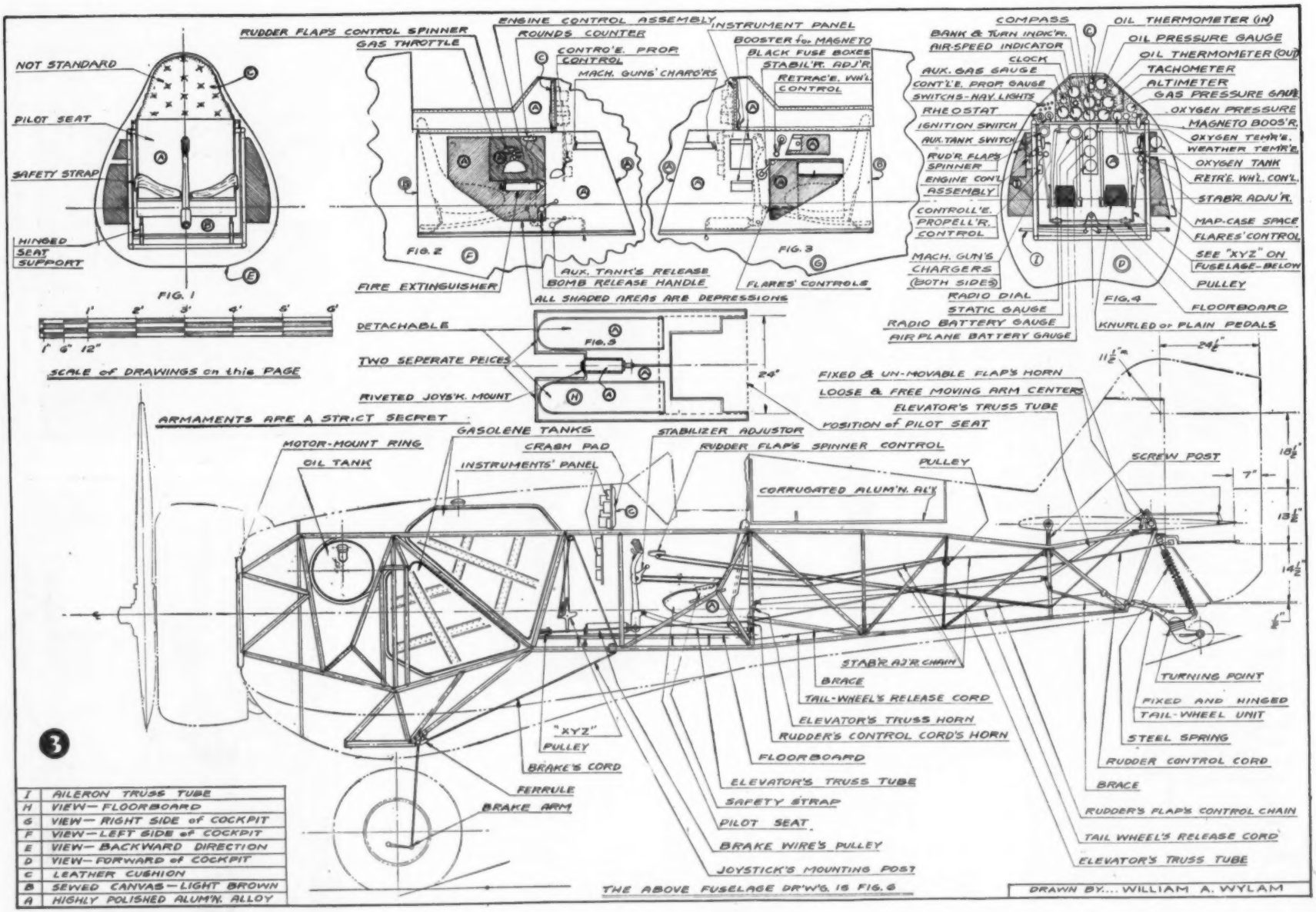
The upper wing is of one continuous panel of light rigid construction. The beams are of hollow box section of spruce and plywood construction. Welded steel fittings are formed about the beams, and are bolted on, for attachments of struts and wires. The ribs are built up of spruce diagonal bracings and plywood webs. Diagonal anti-drag wires are of steel tie rods and are attached to steel compression trusses. The lower panels are of similar construction as the upper one is. The inboard end of each lower panel is attached to the fuselage by steel pins, which pass through the lugs, which are bolted to the beams' ends. Double flying wires are provided for both front and rear beams of the upper panel; and run to fittings, which are attached to the front beams of the lower panels. The wires are connected with separators to deaden the vibration, and are of streamlined shape. The leading edges of both wings, from the front beam around the nose are covered with dural sheets. Wings, panels and ailerons are covered with cotton cloth and are sewed to the ribs. The ailerons' ribs are of dural sheets and are welded to their beams. The beams are hinged to the rear beams of the upper wings; and the

(Continued on page 47)



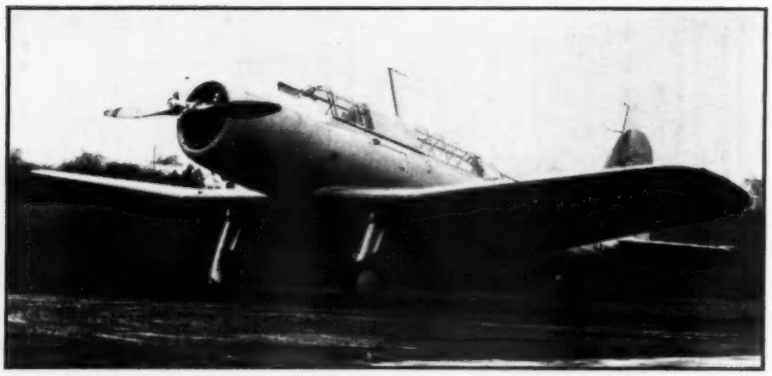
The front view shows the wing alignment clearly


RIB 1
RIB 2
RIB 3
RIB 4
RIB 5
RIB 6
RIB 7
RIB 8
RIB 9
RIB 10
RIB 11
RIB 12
RIB 13
RIB 14
RIB 15
RIB 16
RIB 17
LOWER WING'S RIBS.
UPPER WING'S RIBS
RIB 41
RIB 40
RIB 39
RIB 38
RIB 37
RIB 36
RIB 35
RIB 34
RIB 33
RIB 32
RIB 31
RIB 30
RIB 29
RIB 28
RIB 27
RIB 26
RIB 25
RIB 24
RIB 23
RIB 22
RIB 21
RIB 18
RIB 19
RIB 20
REFER TO SIDE VIEW OF THREE-VIEW DRAWINGS.
RIB-7A
RIB-8A
RIB-9A
RIB-10A
RUDDER & FIN RIBS
HOSE RIB
1A
2A
3A
4A
5A
6A
STABILIZER & ELEVATOR RIBS
BUILD-UP BOX CONSTRUCTION of BEAMS
BOLTED ALUMIUM ALLOY FITTINGS
REAR BEAM — UPPER WING
FRONT BEAM — UPPER WING
FRONT BEAM — LOWER WING
REAR BEAM — LOWER WING
SIAM
RED
BLUE
SIAM
CANTON-CHINA
SHANGHAI-CHINA
ARGENTINA
SKY BLUE
GOLD
ARGENTINA
CANTON & SHANGHAI-CHINA
FLOATS ARE SPECIAL EQUIP'T.
INFLATED POSITION
EMERGENCY FLOATS
FUSELAGE
BOMB RACK
BEAMS' CENTERS
LOCATION of INSIGNIA
RETRAC. WHEEL MECHANISMS
SEE AIR BOMB'S DRWGS. WHEN PRINTED USE
DEMOLITION BOMB — 100 LBS.
2
R WIRES & STRUTS ATTACH'TS.
U SPRUCE
Q ALUM. ALLOY FITTINGS
P FUSELAGE SKELETON'S CENTERS
O COUNTER BALANCE
N WHEEL WELL
M RETRACTING CHAIN
L RETRACTING HANDLE
K RETRACTING SCREW
J ALUM. ALLOY AILERON RIBS
I ALUM. ALLOY NOSE RIBS
H 1/8" SQUARE SPRUCE STRIPS
G DRILLED ALUM. ALLOY SHEET RIB
F MAIN GAS TANK'S VALVE ENTRANCE
E OIL COOLING RADIATOR
D TRANPARENTS INSPECTORS
C INSPECTION DOORS
B AUX. GAS TANK'S WIND COWL
A AUX. GAS TANK'S EMGEY. VALVE
SCALE: SAME AS THREE-VIEWS'
DRAWN BY.. WILLIAM A. WYLAM
CURTISS EXPORT HAWK "III-C"


RUDDER FLAP'S CONTROL SPINNER
GAS THROTTLE
ENGINE CONTROL ASSEMBLY
ROUNDS COUNTER
CONTRO'E. PROP. CONTROL
MACH. GUNS' CHARG'RS
INSTRUMENT PANEL
BOOSTER for MAGNETO
BLACK FUSE BOXES
STABIL'R. ADJ'R
RETRAC'E. WH'L CONTROL
COMPASS
BANK & TURN INDIC'R.
AIR-SPEED INDICATOR
CLOCK
AUX. GAS GAUGE
CONT'L'E. PROP. GAUGE
SWITCHS-NAV. LIGHTS
RHEOSTAT
IGNITION SWITCH
AUX. TANK SWITCH
RUD'R. FLAP'S SPINNER
ENGINE CON'L ASSEMBLY
CONTROLL'E. PROPELL'R. CONTROL
MACH. GUN'S CHARGERS (BOTH SIDES)
RADIO DIAL
STATIC GAUGE
RADIO BATTERY GAUGE
AIR PLANE BATTERY GAUGE
OIL THERMOMETER (IN)
OIL PRESSURE GAUGE
OIL THERMOMETER (OUT)
TACHOMETER
ALTIMETER
GAS PRESSURE GAUGE
OXYGEN PRESSURE
MAGNETO BOOS'R.
OXYGEN TEMR'E.
WEATHER TEMR'E.
OXYGEN TANK
RETR'E. WH'L. CON'L.
STAB'R. ADJU'R.
MAP-CASE SPACE
FLARES' CONTROL
SEE "XYZ" ON FUSELAGE-BELOW
PULLEY
FLOORBOARD
KNURLED or PLAIN PEDALS
NOT STANDARD
PILOT SEAT
SAFETY STRAP
HINGED SEAT SUPPORT
FIG. 1
FIG. 2
FIG. 3
FIG. 4
FIRE EXTINGUISHER
AUX. TANK'S RELEASE
BOMB RELEASE HANDLE
FLARES' CONTROLS
ALL SHADED AREAS ARE DEPRESSIONS
1' 2' 3' 4' 5' 6'
1' 6" 12"
SCALE of DRAWINGS on this PAGE
DETACHABLE
TWO SEPERATE PEICES
RIVETED JOYS'K. MOUNT
FIG. 5
24"
FIXED & UN-MOVABLE FLAP'S HORN
LOOSE & FREE MOVING ARM CENTERS
ELEVATOR'S TRUSS TUBE
POSITION of PILOT SEAT
ARMAMENTS ARE A STRICT SECRET
GASOLENE TANKS
STABILIZER ADJUSTOR
MOTOR-MOUNT RING
CRASH PAD
RUDDER FLAP'S SPINNER CONTROL
OIL TANK
INSTRUMENTS' PANEL
PULLEY
CORRUGATED ALUM'N. AL'Y
SCREW POST
7"
18½"
13½"
14½"
STAB'R. ADJ'R. CHAIN
BRACE
TAIL-WHEEL'S RELEASE CORD
ELEVATOR'S TRUSS HORN
RUDDER'S CONTROL CORD'S HORN
FLOORBOARD
ELEVATOR'S TRUSS TUBE
SAFETY STRAP
PILOT SEAT
BRAKE WIRE'S PULLEY
JOYSTICK'S MOUNTING POST
"XYZ" PULLEY
BRAKE'S CORD
FERRULE
BRAKE ARM
TURNING POINT
FIXED AND HINGED TAIL-WHEEL UNIT
STEEL SPRING
RUDDER CONTROL CORD
BRACE
RUDDER'S FLAP'S CONTROL CHAIN
TAIL WHEEL'S RELEASE CORD
ELEVATOR'S TRUSS TUBE
I AILERON TRUSS TUBE
H VIEW—FLOORBOARD
G VIEW—RIGHT SIDE of COCKPIT
F VIEW—LEFT SIDE of COCKPIT
E VIEW—BACKWARD DIRECTION
D VIEW—FORWARD of COCKPIT
C LEATHER CUSHION
B SEWED CANVAS—LIGHT BROWN
A HIGHLY POLISHED ALUM'N. ALLOY
3
THE ABOVE FUSELAGE DR'W'G. IS FIG. 6
DRAWN BY.... WILLIAM A. WYLAM

Frontiers of Aviation

What Airplane Builders Are Doing to Meet the Increased Demand for Higher Speed, Longer Flights and Larger Payloads—Build the A-18 Attack



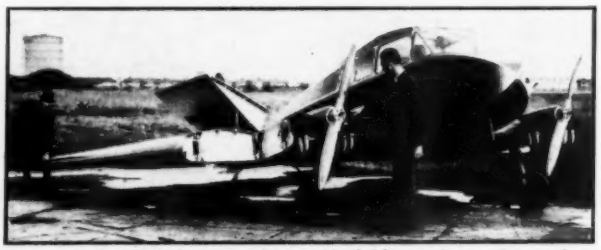
The Vought XSB2U-1 two-seater fighter. (Off. Photo U. S. Navy)

By ROBERT C. MORRISON

WHEN one looks at our modern airplanes today, one sometimes wonders how they could be improved. Especially with our new luxurious airliners now flying in all parts of the world. However, according to many designers, the performance of airplanes will increase at least 50% within the next five years. Though this may seem extraordinary at first thought, when one observes the progress of research in aerodynamics these days, such super-performance is only natural. The main factors in increasing airplane performance are sub-stratosphere flying, larger power plants, in-line engines, decrease in parasite drag, new wing flaps, larger size (of transports), and perhaps the possible advancement in the design of propellers for stratosphere flying. From the experiments D. W. Tomlinson and the Army Air Corps have been doing at high altitudes it seems that an enormous increase in speed may be obtained. It is not likely however that we will have transports flying at heights greater than 35,000-40,000 feet, but even at those altitudes tail winds may sometimes be found at 200 m.p.h. velocities. Then the density of the air is much less than at sea level which allows for still more speed. From the theoretical standpoint Mr. T. P. Wright of the Curtiss Aeroplane & Motor Co., predicts in the Journal of Aeronautical Sciences the stratosphere flying will increase the performance of transports 21% within the next five years.



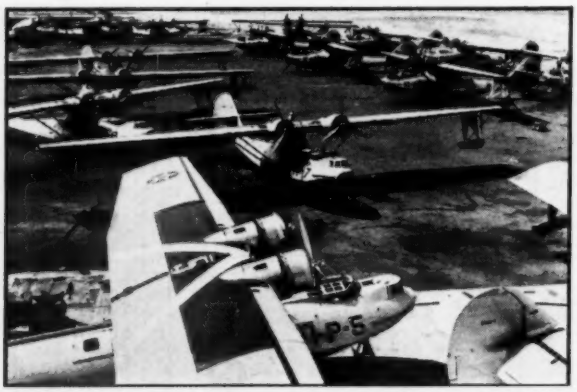
A Focke-Wulf Stosser, one of the new fast German ships. (J. Williams)



A two-engine British sport plane with folding wings. It requires very little storage space. (Globe)

Glenn L. Martin in the last few months is the manufacturer who has held the spotlight where high altitude flying is concerned. In his plant at Maryland a huge fuselage has been built to withstand the high pressures encountered in the sub-stratosphere. This was subjected to tests under identical conditions as encountered in the sub-stratosphere. Much was found out from these tests of the effects high pressures had on humans and airplane structures. It was found that it was entirely possible and very practical to operate our future transports in the sub-stratosphere. We mentioned in last month's issue that Glenn L. Martin has designed a four-engined transport for immediate production which will make use of the rarefied air at high altitudes. The ship is known as the Martin Streamliner. As a day liner it carries 40 passengers—as a sleeper, 20. A crew of five, pilot, co-pilot, radio operator, flight engineer and steward, will man the ship. The plane is a low-wing with a very spacious control cabin for the crew in the extreme nose.

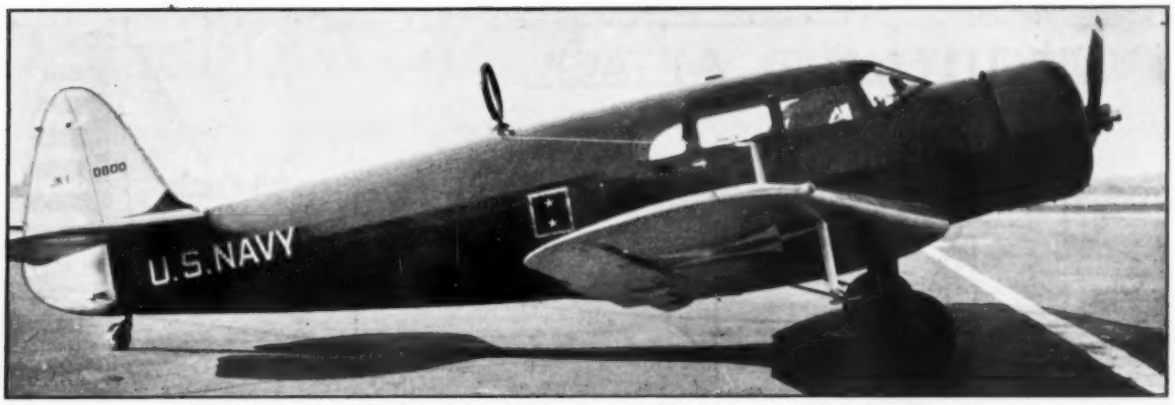
One thing certain in the advent of high altitude flying is that new propellers with wider blades will be designed to deliver



The fleet of 12 U. S. Navy Patrol planes just before the start of their remarkable flight to Hawaii. (Acme)



An instructor and student examine the flap mechanism on a Miles Trainer. (British)



The U. S. Navy Fairchild "45", used for "command" purposes. (J. Soderberg Photo)

the same thrust in less dense air as our props now do at sea level. Better spark plugs will also be a necessity as it was found that our present plugs do not stand up to expectations in high supercharged engines as used for the substratosphere.

In a year's time (as we forecast last year) the horsepower output of American engines has increased tremendously. At present we have in mind the twin-row Wright Cyclone boasting of eighteen cylinders which has passed its initial trials for the Army recently! It has a displacement of 2600 cubic inches, and it is our guess that it packs away 1,600 hp. or more! The latest single-row Cyclone now delivers 1,100 hp.

Giant in-line engines will be coming more popular in the next few years, and these not only having increased power output, will have less frontal area and may afford better streamlining. Designers will have to be more careful in the selection of their engines in the future because of the various shapes and sizes that will be available. Today with radial engine supremacy, a plane may be built to carry any of several engines having comparatively the same horsepower. All that is needed is an engine mount slapped onto the ship to carry almost any of them with certain cowlings and fairings to match. However with forthcoming in-line and flat type engines that will be imbedded in the wing or fuselage the airplane will have to be designed around these engines for best streamlining and performance. This will be especially true of our new military ships, the performance and appearance of which will make some of our present military ships look like they belonged with Alice in Wonder Land. Our pursuits will be literally flying power plants.



One of the new 950 hp. Bellanca "Flashes" built for the French Airmail Service. (J. Soderberg Photo)



The latest Aeronca two seat, side by side sport plane. (J. Tenety)

The larger size of airplanes tend to be much more efficient for many reasons. First as we have pointed out in previous issues the metal "skin" thickness on the outside of an airplane increases to a lesser extent in proportion to the size of the airplane—thus comparatively lighter construction is obtained. However the "stressed skin" increases in thickness enough so flush rivets may be used which lowers parasite drag and adds more speed to the transport or bomber. Such equipment as radios weigh the same on a smaller airplane as they do on a larger one. While these weights remain constant the lift of the airplane increases with size and thus more average payload is carried.

Better structures will make way to lighter construction, and these days much is being discussed about berylium and its possible use in airplane construction. It is a very light metal and there is a possibility that within a short period of time this metal may be available in large quantities for airplane manufacture—so some engineers say.

Many engineers predict that wing flaps will make it possible to increase the wing loading of an airplane to 40 pounds per

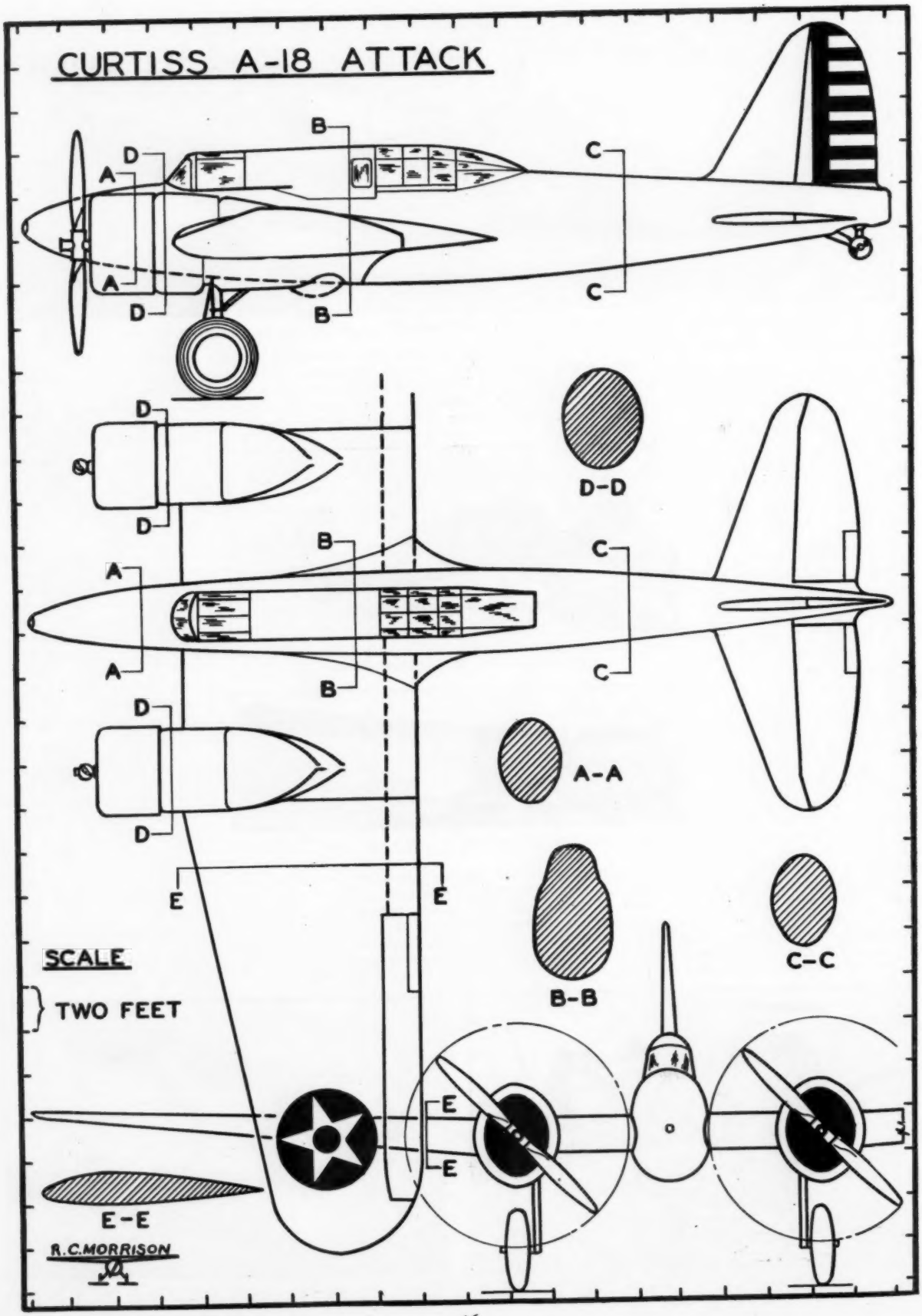
(Continued on page 53)



One of the latest Russian sport planes so called, but which is actually an experimental pursuit ship. (Sovfoto)



The Henchel single-seat pursuit ship. This is one of the latest German fighter-bombers. Note the bomb


CURTISS A-18 ATTACK
A
B
C
D
E
D-D
A-A
B-B
C-C
E-E
SCALE
TWO FEET
R.C.MORRISON

Designing Your Model for Duration

How to Determine the Size and Proportions of Your Duration Contest Model That Will Give the Greatest Efficiency

Chapter No. 5 By CHARLES HAMPSON GRANT Article No. 64

THE objective of every model builder, at least during one period of his career, is to build a fine duration model. In the preceding articles of this series, the aerodynamic qualities that such a plane should have were listed and discussed. From an analysis of the situation it was clear that a duration model should have the following qualities:

1. The model should fly as slowly as possible. 2. The motor should be as powerful and absorb as many turns as possible. In other words it should be capable of absorbing and delivering as much *work* as possible. 3. The propellers should turn as slowly as possible in relation to the power developed by the motor. If they must turn relatively fast, the speed should be tolerated only if it produces a comparable climb. 4. The model should have the highest L/D, or lift-drag ratio possible. 5. It should possess great ability to climb to a high altitude. 6. The plane should have soaring qualities to a high degree. 7. It should circle without extreme banking tendencies. 8. It should be exceedingly stable.

It was decided after an analysis of the problem that the type of plane in which these qualities might be embodied to the highest degree, was the single propeller tractor monoplane.

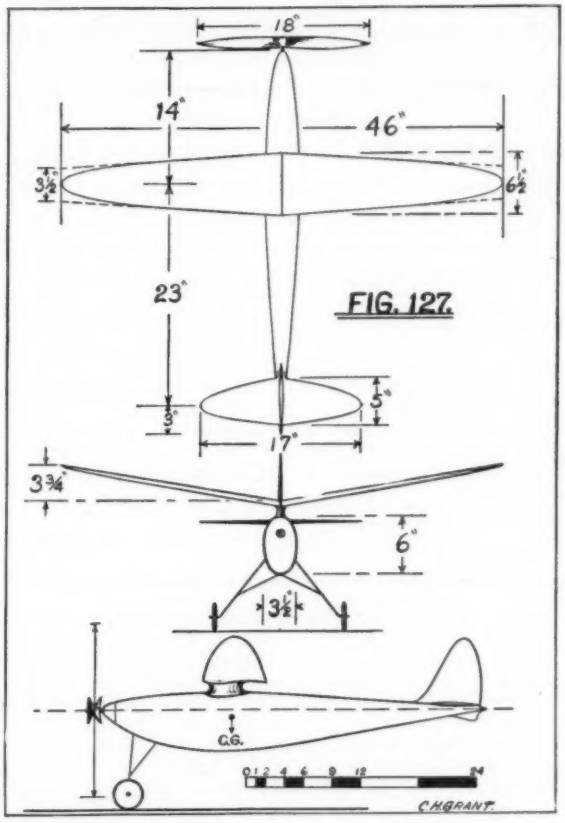


FIG. 127.

Size of Model

The next step in designing the duration model is to choose the size that you wish your model to be in order to fulfill contest requirements and to have it render the best performance. Usually the larger the model is made the better the performance will be. This is due to the fact that the propeller becomes more efficient with an increase in its size, and because the lift coefficient of a wing increases with the size of the wing used. This last statement means that the larger the wing, the more it will lift *per square inch of area* at any given speed.

The two international contests, the Wakefield and the Moffett contests, require that models have from 190 to 210 square inches of wing area in order to be eligible to compete in them. A plane with this amount of wing area is considered to be quite large and it therefore may be made very efficient aerodynamically. Such a model, in order to conform with weight rule specifications for these two contests, must weigh eight ounces. A model of this size also may be entered in the Stout Fuselage Model Contest. However in this event it has to weigh only six ounces, or one and a half ounces for every fifty square inches of wing area.

The most convenient model to design and build would be one of 200 square inches of wing area, weighing six ounces, with one size motor and propeller, and weighing eight ounces with a larger motor and propeller. This is possible and yet have the model fly efficiently with either power plant. If the larger power plant cannot be made to weigh two ounces more than the smaller one, then the total weight of the model with the small motor and propeller may be made to weigh slightly over the minimum required weight of six ounces, six and a half ounces, for instance.

Proportioning the Model

Now that you know the size and weight your duration model is to be, it is necessary to make one of the most important steps in designing your model. That is, to establish the general proportions of the plane. These determine its efficiency and stability to a large extent.

The Wing

The factor upon which the measurements of other parts of the plane are based, is the wing span. This must be established so that the wing will have 200 square inches of area (projected) and an aspect ratio which will give great efficiency. This means that the aspect ratio must be at least eight; this would give high efficiency and the stresses would be moderate so very heavy construction would not be required.

The best form of wing to use is a tapered one with elliptical wing tips. This type not only gives greater efficiency and is lighter in weight but a lower aspect ratio may be used without loss of efficiency. A value of nine will give excellent results under these conditions.

Therefore if the wing is given a span of 46 inches and an average chord of five inches the aspect ratio will have the required value of (9), and the area will be about 200 square inches, when the wing tips are tapered and rounded to an elliptical form.

As the whole wing should be tapered as well as making the tips elliptical, the chord at the center of the wing should be larger than 5 inches and the tip chord smaller. If a center chord of 6½ inches and a tip chord of 3½ inches is chosen, the average chord will have the required value of 5 inches, and a satisfactory taper will be established. Such a wing would have blunt tips so each tip should be cut away to an elliptic form as shown in Fig. No. 127. Before the tips are shaped the area of the wing would be (46 x 5) or 230 square inches in area. However by shaping the tips carefully, cutting away the corners as shown, the area will be reduced approximately 30 square inches, which will allow the wing to have the required 200 square inches of area.

Wing Section

It is highly important to select a suitable wing section for your duration plane. Two important requirements for this type of ship are that the wing has a high L/D ratio and a high lift coefficient. The former insures the greatest amount of lift with a minimum amount of drag, while the latter will provide as slow a flight as possible, for the greater the lift of the wing is, the slower the plane will fly.

There are several wing sections which will give excellent results. One is the R.A.F. No. 32. Another is the G-3, the wing section used on the KG-3 gas model designed by the author. (This is shown on page 25

(Continued on page 62)

National Aeronautic Association Junior Membership News

Prepared by National Aeronautic Association, Dupont Circle, Washington, D. C.

Get Your Model Planes Ready Now for the 1937 National Championship Meet

Detroit Sponsoring City for 1937 National Meet

The 1937 National Model Meet will be held at Detroit, Michigan on the dates of July 7-12 inclusive.

Announcement that the newly-formed NAA Chapter at Detroit would head up the organization of the meet was made by the Chapter following a trip to Detroit of W. R. Enyart, Secretary of the NAA Contest Board, to discuss the matter with interested civic groups of the automobile metropolis.

The Detroit Committee is now busy on plans which should make the meet even bigger and better than the 1936 contest. The sponsoring group is headed by Harry Gardner, well-known sportsman pilot and official of the Square D Manufacturing Company, who is president of the newly-formed Chapter.

Closely associated with Mr. Gardner will be Tom Colby, president of the Sportsman Pilots Association and also president of the Air Activities Association of Detroit. Mr. Colby, who flies a Beechcraft and has been a pilot for many years, is manager of the aviation department of Berry Brothers of Detroit.

Many leaders, clubs and other organizations in the model field in all parts of the country, as well as the N.A.A. Detroit Chapter, are lending their experience and are cooperating with the N.A.A. in formulating plans for making the meet an outstanding success.

Wayne County Airport will again be the site of the outdoor contests. Henry Baker, airport manager, has set aside the meet dates on his schedule of activities for the airport.

Model flyers consider Wayne County Airport one of the finest sites in the United States for outdoor flying due to the openness of the surrounding terrain and the ease with which long flights can be followed. Although the airport is one of the most important in the country it has no scheduled transcontinental operations to interfere with the model flights.

Announcement of the selection of Detroit terminates a four-way competition for the meet among Akron, St. Louis, Detroit and New York. At a model conference held in Washington in March these four cities were designated in the order named as the most desirable for location of the meet. Neither Akron nor St. Louis was able to sponsor this year's event. Both, however, indicated interest in sponsoring the contest for next year.

Rules for the contest were announced in the last issue of this magazine. Copies of the rules may be obtained from NAA headquarters in Washington. Requests for entry blanks should be addressed to the National Aeronautic Association Contest Board, Dupont Circle, Washington, D. C.

H. M. Jellison, of Akron, will be Contest director of the meet.

PURPOSES OF THE NATIONAL AERONAUTIC ASSOCIATION OF U.S.A.

1. To encourage private flying and the provision of every needed facility for this activity.
2. To guide and direct the aeronautical interest and activities of the youth of our nation.
3. To encourage the full and immediate development of our civil air transport system.
4. To acquaint the American public with the status of our national air defense and to encourage its orderly and adequate development.
5. To encourage the orderly development of airport and landing field facilities throughout the nation and the provision of every necessary navigational aid.
6. To encourage, promote, sanction and carry on aerial expositions, exhibits and contests and to provide for the granting of awards and distinctions for contributions to the advancement of aeronautics.
7. To lend its support to scientific societies, clubs, schools and other institutions engaged, in whole or in part, in promoting the study or advancing the science of aeronautics.
8. To gather and compile information having to do with aeronautics and to edit, publish and distribute the same in the form of bulletins, pamphlets, magazines and books.
9. To encourage the enactment of uniform federal, state and local laws relating to aeronautics.
10. To cooperate with federal, state and local governmental and civic agencies in the promotion of aeronautics.

(ARTICLE II, Section 1, N.A.A. By-Laws)



Robert Kirch and his prize winning scale model of a Boeing F4B-4

Status of the Wakefield Fund

Two more contributions to the Wakefield Fund, established by the NAA to insure financing of a team of six U.S. model builders to enter the 1937 Wakefield Contest in England, have been received. Donations by Harold Stofer, well-known Indianapolis builder, and Mrs. Stofer, and by Joseph Kovel, of Brooklyn, together with the enthusiastic good wishes of the contributors for the success of the U.S. representatives in the contest, have been sent to NAA Headquarters.

George Johnson, publisher of MODEL AIRPLANE NEWS, made the first donation of $100 and Edward Roberts, of the Junior Motors Corporation, of Philadelphia, was second contributor.

The goal is $2,000; the contest date August 1.

It is hoped that further substantial contributions can be reported soon. These should be addressed to "The Wakefield Fund," care of the National Aeronautic Association, Dupont Circle, Washington, D.C.

Organizations contributing will be allowed to display a seal now being made up and which will read: "We Contributed to The Wakefield Fund." Individuals will be furnished with contributors' cards, also, indicating that they have supported the fund.

NAA Board Sanctions Six Model Contests

Sanctions have been issued by the NAA Contest Board for six interesting model meets to be held in four states during May and June.

One of the foremost events will be the Fifth Annual State Model Contest, to be held at Lansing, Mich., on June 5 under sponsorship of the State Department of Aeronautics. Two hundred entrants are expected to compete for the trophies, a ground school course, two cross-country



Junior contestants, Chicago Park District, Class "A" at the N.A.A. Indoor Glider Contest, sanctioned March 6, 1937 (10 A.M. to 12 M.)

flights, local flights and certificates. The contest will be held at Field House, Michigan State College, for scale models, R.O.G. and gasoline models. Col. Floyd E. Evans, State Director of Aeronautics, will be Contest Director.

Another Michigan event will be a two-day contest for both indoor and outdoor models to be held at Battle Creek on May 16 and 17. The meet, sponsored by the Battle Creek Junior Chamber of Commerce, will have a junior and a senior division with indoor flying (hand-launched), indoor commercial, flying scale, R.O.G. and solid scale (non-flying) model contests. A gas model contest will be a feature in conjunction with the outdoor contest for which the Junior Chamber of Commerce is offering a silver cup as first prize. A number of cash prizes and kits will be awarded also.

On May 22 a gas model meet, sponsored by the International Gas Model Airplane Association and MODEL AIRPLANE NEWS, will be held at Hadley Field, near New Brunswick, N. J. The meet will be governed by I.G.M.A.A. rules. Charles H. Grant, editor of MODEL AIRPLANE NEWS, will be director of the contest which will award trophies, merchandise and medals.

Connecticut's Ninth Annual Model Airplane Meet was held at Rentschler Field, Hartford, on June 5. This year the contest was limited to outdoor models for R.O.G., outdoor stick, solid scale and R.O.G. gas types. Cups and medals were awarded to the winners with the United Aircraft Cup going to the high point winner. Frank W. Schade, of the Junior Achievement Foundation, New Britain, Conn., served as Contest Director.

The Aviation Committee of the Rockford, Ill., Chamber of Commerce, in conjunction with the Rockford Kiwanis Club, will sponsor a Mid-West outdoor model contest at Rockford Airport on June 6. The competition will embrace the performance of hand-launched models, gas models, stick and fuselage models. Four trophies and sixteen medals will be awarded. Dr. F. H. Spickerman, Chairman of the Rockford Chamber of Commerce Aviation Committee, will be Contest Director.

And on the same day, June 6, another model meet will be run off at Utica, N.Y. This will be an outdoor event for hand-launched stick models, fuselage R.O.G., and gas-powered. The contest is known officially as the New York State Exchange Model Airplane Meet and is a feature of the State Convention of the New York State Exchange Clubs. The meet is open only to representatives of model airplane clubs sponsored by Exchange Clubs. Harry C. Copeland, president of the Syracuse Aeronautics Association, will be Contest Director.

Sanctioned contests held recently included: the Jordan Marsh-Boston Traveler Monthly Contest at Boston on May 1, with Willis Brown as Contest Director; the Hudson County Junior Chapter, NAA (Jersey Mosquitoes) Outdoor Contest at Lincoln Park Field, Jersey City, N.J., on May 2, where William Shimshak was Contest Director; and the Stix, Baer and Fuller Model Airplane Club Contest at St. Louis, Mo., on May 8, of which H. T. Sommers was Contest Director.

Results of these contests are now being checked at NAA Headquarters in Washington and any records will be reported in these columns next month.

Chicago Nuts Gather 12 New Model Records—

To its already imposing list of national records for model airplane performances.

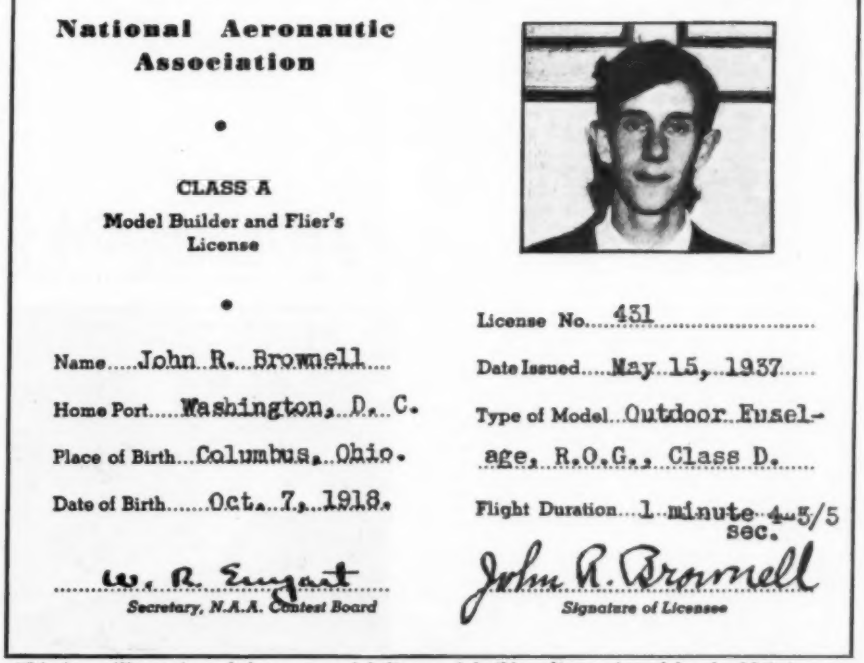
Scope of NAA Objectives And Value to Chapters

To acquaint the ever-growing number of model builders with the scope of the NAA's work, objectives and benefits of affiliation, especially with relation to the formation of Junior Chapters, the following paragraphs are published:

What is the NAA?

The National Aeronautic Association (NAA) is the oldest patriotic, non-commercial, non-profit organization for the promotion of flying in the United States. As such it has special interest in the stimulation and guidance of model building.

Among the membership lists of the National Aeronautic Association will be found the nation's most famous aviation leaders. Such well-known pilots as Jimmie Doolittle, Al Williams, Roscoe Turner, Major Seversky, Howard Hughes, Ben Howard and Harold Neumann are NAA members. Many are members of the NAA's justly



This is an illustration of the *new model fliers and builders license* issued by the N.A.A. Contest Board to N.A.A. members in good standing who can meet the flight qualifications in officially timed flight trials. The minimum requirements are two minutes with any type of model indoors and one minute outdoors. (Picture courtesy of Maxwell Bassett)



Frank J. Tlush, prominent model and motor builder, who has been appointed to Model Meet Committee

renowned Professional Racing Pilots Chapter. For many years Orville Wright, the world's first pilot, served as Chairman of the NAA Contest Board. The Industry's foremost leaders, such as Glenn Martin, Donald Douglas, William Boeing, Dr. George W. Lewis, Director of Research of the National Advisory Committee for Aeronautics and Vincent Bendix, are members.

The National Air Races, National Balloon Races, Miami Air Races, in fact, *all* important flying contests held in the United States and all official National (U.S.) and World records, such as Howard Hughes' landplane speed record of 352 m.p.h. and the Army-National Geographic Stratosphere Altitude record are conducted under NAA sanction, supervised by NAA officials and the performances obtained, certified correct by the NAA.

Since 1905, the NAA has been the representative in the U.S.A. of the Federation Aeronautique Internationale, the world's greatest international aeronautic organization, with which the national associations of 35 nations are affiliated. As a member of the F.A.I., as it is known, the NAA has recently been successful in gaining recognition by that organization of world model records, which means that U. S. winners of world model records henceforth will be officially recognized in 35 nations of the globe!

In the NAA program in the model field, more model contests, better run, and recognition of model performances that are outstanding, are primary objectives. By these objectives it is felt all model building is stimulated and new converts to model building won. In addition, by Club organization, it is felt the exchange of ideas is stimulated and the general aeronautic education and guidance of members furthered.

An example of National NAA Model Activity is the organization annually of the National Championship Model Airplane Meet. This, the oldest and most famous national model contest in the world, offers traditionally renowned trophies, many of which, such as the Mulvihill and Stout, have been in competition for more than a decade. Thus also, the famous Wakefield trials are held under NAA supervision. In the rapidly growing gas engine model field, an increasing number of trophies and worth-while cash prizes are offered upon NAA sanction.

Another example of National NAA model activity is the growing list of official world and national model aircraft records at NAA Headquarters in Washington. These cover a wide variety of model aircraft types and sizes and each record holder has been issued an "official" certificate attesting to his record. The national program of the NAA for 1937 in Model Aeronautics includes such forward-looking items as the following:

1. Assumption of full responsibility by the National Aeronautic Association, through its National Contest Board, for the organization and conduct of the 1937 National Championship Model Airplane meet on June 30, July 1, 2 and 3.

2. NAA Charter of a National Chapter of Expert Model Builders and Flyers with this National Chapter charged with the responsibility of planning and supervising NAA activity in the model field. A record of special achievement in model work will be a prerequisite for membership in this National Chapter. Among its purposes will be the promotion of achievement awards, scientific discussion, and interchange of opinions on international questions with official model organizations of other nations.

3. Organization at Washington during the winter season, 1937-38, of a National Model Aircraft Conference. This conference to parallel the National Intercollegiate Flying Conference, which has been held annually under NAA sponsorship with so much success for college flyers, and to feature, in addition to presentation of National Honorary Awards, a series of technical discussions and "papers" on current construction and flying advances of special interest to the expert builder.

4. Study by the NAA and its National Model Experts Chapter of the question of organization, with the help of model leaders and NAA District Vice Presidents and State Governors, of regional and state-wide model championship meets, including sponsorships for suitable permanent trophies, and the advisibility of official recognition by the NAA of a limited number of "official" regional and state-wide records.

Nor do the interests of the Association among young men and young women stop with model contests and model performance recognition. The NAA encourages Intercollegiate Flying, through the activity of the National Intercollegiate Flying Club Chapter and the NAA sponsored National Intercollegiate Air meet. Gliding and Soaring is encouraged through annual sanction by the NAA of the famous National Soaring Contest at Elmira and by award to deserving pilots of the Class A, B and C glider licenses of the NAA.

How Do Local Model Groups Benefit by Affiliation With the NAA?

Local groups which affiliate with the NAA as Junior Chapters benefit themselves locally by the prestige affiliation with such a prominent national non-commercial, patriotic flying organization brings *and by the services obtained from NAA Headquarters through such affiliation.* In turn, affiliated local groups serve National NAA activity by adding their local influence to such activity.

The services obtained from NAA Headquarters by Junior Chapters are of two kinds: (1) services to the Chapter of value to the Club as a group. Such services help Chapter officers to organize meets and other Club activity; (2) services to those individual members, who through such individual membership, help to make it possible for their Club to obtain its Chapter charter.

Both such services, what they offer the Club and what they offer the individual are explained in further detail below:

Individual Membership Benefits—Junior members receive or are eligible for the following membership benefits:

(1) The NAA junior membership card and lapel pin.

(2) The annual sporting license for model builders, now a requirement for entrance in sanctioned meets under international F.A.I. sporting rules.

(3) As a holder of this sporting license, eligibility for entrance in any model aircraft contest sanctioned by the NAA, with the right of protest and appeal, and eligibility for award of NAA Chapter certificates of local performance and 1st, 2nd and 3rd place NAA "Ribbons" available for all local and city-wide "sanctioned" meets.

(4) Upon proper written application, official recognition of any national records established, together with an engraved "record" certificate attesting to such records.

(5) Upon proper completion of performance requirements and upon written application, the new NAA Model Builders and Flyers "A" license. This performance license, which parallels the Class "A" glider license issued by the Association to glider pilots, takes the form of a pocket-sized license booklet. It is issued only to those members who in officially timed flights are able to meet either of the following flight requirements: an official flight with any type of outdoor model of at least 1 minute, or an official flight with any type of indoor model of at least 2 minutes.

(6) Upon written request any national record lists, drawings of record-breaking model aircraft, model rules or listing of sanctioned model contests, published by the Association during the year.

Club Benefits as an NAA Chapter—Club groups holding a Junior Chapter charter of the NAA, in good standing, receive the following Club benefits: These come as special services from NAA Headquarters without additional charge.

(1) Upon written application and where the official sanction requirements will be met, NAA Contest Board sanction of model meets organized by the Chapter. When granted, each such sanction will include a model meet "kit." This "kit" includes the following: official Contest Board badges and windshield stickers for officials and press representatives, model rules and regulations, latest list of official records, forms for reporting meet results, award ribbons, merit certificates of local performance, forms for requesting recognition of national records, etc.

(2) The NAA Junior (Model Builders) Chapter Manual: This is a 32-page mimeographed treatise for Club officers, containing useful material on weekly Club meetings and how to organize them; suggested Club trips and outings; suggested ceremonies for induction of new members and awarding certificates; Club contests, their organization and conduct, with twelve highly interesting and entertaining "special" contests described in detail; ratings for model builders with suggested requirements for five progressive ratings for awards by the Club for individual achievement; aeronautics study courses and suggestions for conduct of such courses; an index of suggested textbooks for such study courses, as: power plants, theory of flight, navigation and sixteen others. Last, but not least, a section on building models and on model building tools and equipment. This section includes an excellent chronology of the 21 leading books now published on model building, and a description of each of the principal types of models with reference to authoritative publications which give detailed information on construction of models of that type.

(3) Three copies of "The NAA Eagle" each month, containing national model news and information on new records, sanctioned contests and activity of NAA model builders. As often as possible, reproductions of scale drawings of record-breaking models are included in "The NAA Eagle."

(4) Such Chapter meeting program "kits" prepared for Senior NAA Chapters during the year, as are deemed of interest for Junior Chapter meeting use. Such meeting program "kits" supply helpful material for the organization of evening discussion meetings, lectures on interesting general aeronautic topics and the like.

(5) Appointment of the Club's Senior Adviser, if properly qualified, as an NAA Contest Director for Model Aircraft. The qualifications required for his appointment in this capacity and the benefits received by such Directors are as follows:

What Are the Requirements for an NAA Junior Chapter Charter?

The NAA issues its Junior Chapter Charter to local Clubs on the following basis: At least ten members of the Club must be junior NAA members, in addition the Club must have a Senior or Club Adviser or NAA Contest Director affiliated with it who must be a regular member of the NAA. These are the normal requirements. However, in cases of very small clubs where even the ten member requirement would work a real hardship, special consideration will be given.

In the case of large groups it is not necessary that all individual members be individual members of the NAA, although it is urged that each club try to have as many of its members individual members of the NAA as is possible, in view of the benefits open to such members.

Sponsorship of each local model Club by a Senior NAA Chapter or by another adult group is strongly recommended, however, this is not a mandatory requirement for Junior NAA Chapters. It is necessary, however, for groups making charter application to have associated with their group the Senior or Club Adviser who, it is urged, should wherever possible be an NAA Model Contest Director.

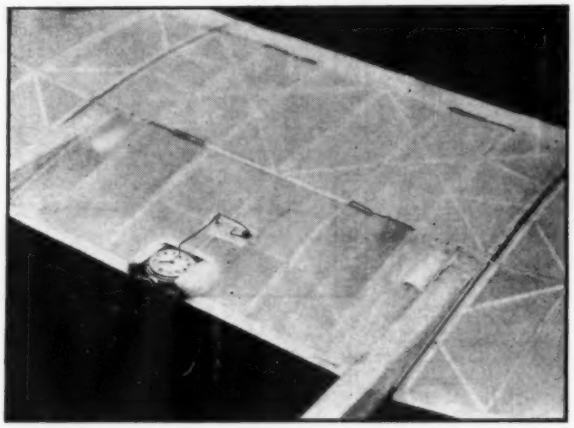
What are the NAA Membership Dues?

Junior membership dues are as follows: first year initiation, 50c; annual renewal thereafter, 25c. The Senior or Club adviser is required to be a regular member of the NAA. Regular membership dues are $3.00 per year. If the Senior or Club Adviser can qualify as a student member, that is OK. Regularly enrolled students of accredited high schools, colleges, trade schools or aviation schools are eligible for student membership. Student membership (same benefits as regular members) is $2.00 per year.

A regular or student member, in addition to the Senior NAA pin and membership card, receives each month "The National Aeronautic Magazine," which contains a model news section and information on new rules, new contests, and the like, as well as a wealth of other aeronautic information and many pictures. It is recommended that Clubs arrange with their Senior or Club Adviser for circulation of his copy of the NAA Magazine among Club members to aid in their general aeronautic education.



The officials of the Aeronuts Gas Model Club of Chicago. Left to Right: Ed. Konefes, Frank Nekumken, Instructor Chicago Park Dept., Hubert Bodinet, sec.; Robert Forster, treas.



E. H. Hughes' device for regulating the duration of engine run on gas model planes; a watch in the wing



Officials of the Chicago Aeronuts Club. Left to Right: Tom Cunningham, edt. of "Aeronut Bulletin"; Lenard Elgensen, librarian; Richard Worel, circulation mgr.; Richard Obarski, sec.; Edmund Swort, pub. comm.; Frank Nekimkin, part dist. inst.; (lower row) Carl Goldberg, pres.; Joe Matules, Jr., v.-pres.; Charles Belsky, circ'l. comm.

How Can the Purposes of an NAA Model Builders Chapter Be Summarized?

These responsibilities can be summarized as follows:

(1) To organize local model contests which will stimulate local model building and recognize outstanding performance.

(2) To support the organization of state-wide, regional and national contests.

(3) To encourage and work toward well run contests, using "proven" standardized contest rules which are fair to all.

(4) To encourage interchange of news, methods and information among its members and among model groups in other cities.

(5) To guide and direct the model aeronautics education of the youth of the community and their own general aeronautic education as well.

(6) To support the work of the National Aeronautic Association in fields other than model aviation, to the end that flying in all its phases will be advanced throughout the United States.

New Contest Directors Appointed by NAA

The NAA Contest Board has announced seven new appointments and two reappointments of Model Contest Directors in its permanent model areonautics program announced recently. Those who have lately qualified for Directorships are:

Col. Floyd E. Evans, State Director of Aeronautics for Michigan and NAA Governor for Michigan, of Lansing; George H. Crose, Denver, Colo.; Howard C. Snyder, Ashland, Ky.; Dr. F. H. Spickerman, Chairman of the Aviation Committee of the Rockford, Ill., Chamber of Commerce; Capt. Alvin G. Davis, Chicago journalist; J. Garry Buyser, associated with the Lockheed Aircraft Corp., Burbank, Calif.; and William S. Berry, of Philadelphia.

Those re-appointed were Frank W. Schade, director of the Junior Achievement Foundation, New Britain, Conn.; and W. L. Timpone, Jacksonville, Fla.

Colonel Evans, who has 2400 hours transport and military flying to his credit and who was a World War pilot, has served as an official in many major air meets. Mr. Crose has been a student of aircraft development for ten years. Mr. Snyder, who is an electrical engineer by profession, has been a model builder and flyer for many years. Dr. Spickerman, a model enthusiast for twenty years, constructed and flew man-carrying gliders when he was sixteen. Mr. Buyser has had several years experience in the drafting-designing and production departments of important aircraft companies. Both Mr. Buyser and Captain Davis have long been interested in model building. Mr. Timpone is senior adviser for the Jacksonville Model Aero Club, an NAA Junior Chapter. Mr. Schade was first president of the New Britain Aero Club, founded in 1910.

Canadian to Enter Moffett Contest

Our congenial neighbor to the north, Canada, is expected to have at least one representative in the moffet Contest at the 1937 National Model Meet in the person of R. Bruce Lester, who writes from Forest, Ontario, that he has a model on his drafting board which he will use and which "will fly Vernon Gray's '36 wings but have a teardrop fuselage." Lester is a Canadian model builder of eight years experience.

Inquiry from "Down Under"

Keen interest in the coming National Model Meet has spread to enthusiasts in all parts of the globe. From the Auckland, New Zealand, Model Aero Club has come a request for full particulars concerning the event. The Auckland Club was winner of the Admiral Moffett Memorial Trophy in 1936 and was New Zealand champion club for 1935 and 1936.

Three Records Topple at Seashore Model Meet

Three national records went toppling at the Seashore Indoor Model Meet held by the Atlantic City Model Airplane Club at Atlantic City, N.J., on April 11. The new title holders and their records are:

Walter Lees, Senior, Class B, Stick Model, R.O.W., 12 minutes, 36.2 seconds.

W. N. Hewson, Junior, Class A, Stick Model, R.O.W., 7 minutes, 25 seconds.

James Throckmorton, Open, Class A, Stick Model, R.O.W., 6 minutes, 10.6 seconds.

These young builders apparently mean business in this matter of setting new records. In January, 15-year-old Joseph Lahuta, junior member of the NAA, made an official flight with a Class B fuselage R.O.W. model of 4 minutes, 57.6 seconds

(Continued on page 41)

Use this coupon for either junior membership application *or* for requesting NAA Junior Chapter information.

NATIONAL AERONAUTIC ASSOCIATION OF U.S.A.
Dupont Circle, Washington, D.C.

☐ Please send me information on how to form an NAA Junior Chapter and a Chapter charter application form. I enclose a 3c stamp for return postage.
☐ I enclose fifty cents for annual NAA Junior membership dues (use check or money order) and hereby make application for Junior membership in the National Aeronautic Association.

Name .....
(Please print or type)

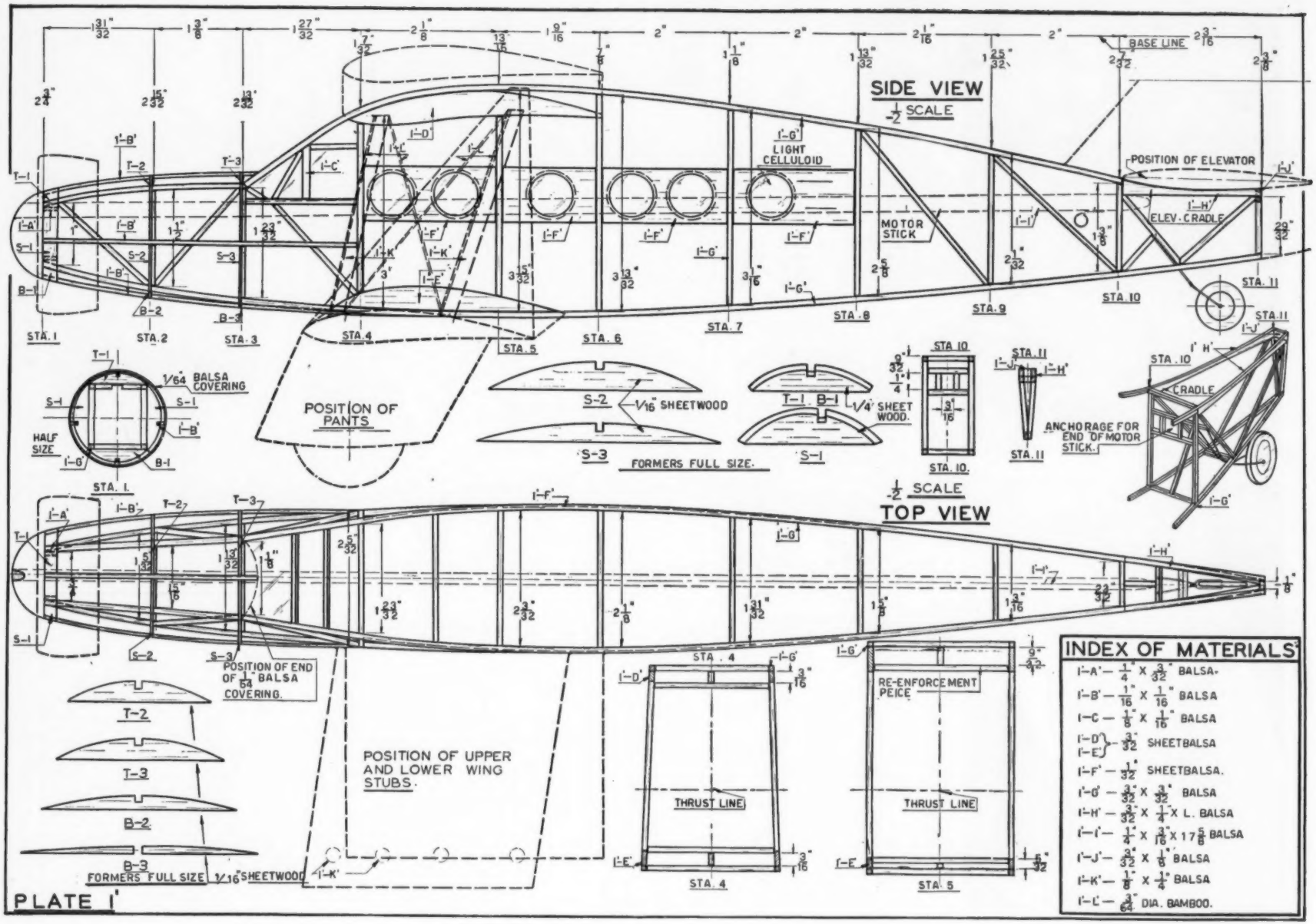
Street .....

City ..... State .....

Date of Birth.....
(Month, Day, Year)

Membership application approved*.....

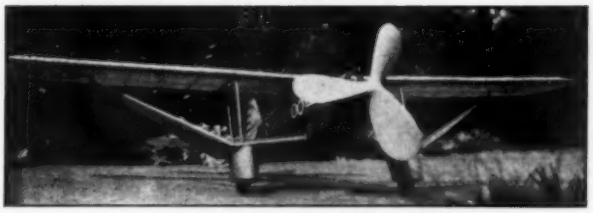
*(If membership application is being made and applicant is under eighteen, have parent sign here.)



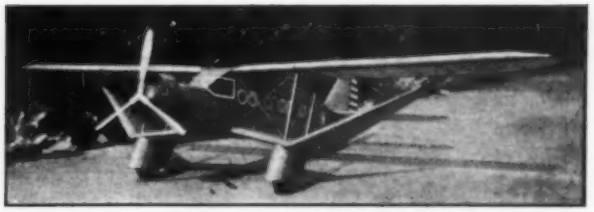
INDEX OF MATERIALS

- 1'-A' — $\frac{1}{4}$" X $\frac{3}{32}$" BALSA.
- 1'-B' — $\frac{1}{16}$" X $\frac{1}{16}$" BALSA
- 1'-C — $\frac{1}{8}$" X $\frac{1}{16}$" BALSA
- 1'-D' 1'-E' — $\frac{3}{32}$" SHEETBALSA
- 1'-F' — $\frac{1}{32}$" SHEETBALSA.
- 1'-G' — $\frac{3}{32}$" X $\frac{3}{32}$" BALSA
- 1'-H' — $\frac{3}{32}$" X $\frac{1}{4}$" X L. BALSA
- 1'-I' — $\frac{1}{4}$" X $\frac{3}{16}$" X 17 $\frac{5}{8}$ BALSA
- 1'-J' — $\frac{3}{32}$" X $\frac{1}{8}$" BALSA
- 1'-K' — $\frac{1}{8}$" X $\frac{1}{4}$" BALSA
- 1'-L' — $\frac{3}{64}$" DIA. BAMBOO.

PLATE 1'



It performs well with a flying propeller



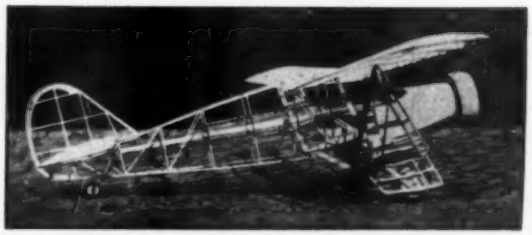
The finished model with scale propeller

A Flying Bellanca Aircruiser

How You Can Build a Flying Scale Model of a Famous Cargo Plane That Includes Many Fine Details of Construction

By JOSEPH KOVEL

THE Bellanca Aircruiser Cargo Landplane, to give it its full title, was designed and built for transport work. Modern transport needs require ships that are fast, economical, yet capable of carrying high pay loads. The Bellanca Aircruiser meets these requirements very nicely. Its single engine and cruising range of 1000 miles assure economy. The high speed of the ship at 7000 ft. is 165 miles per hour, while the cruising speed is 155 miles per hour. (Imagine a freight train cruising at that speed!) The ship weighs 6115 pounds when empty and is capable of carrying a pay load of 4021 pounds. This high weight pay load ratio may be attributed to the unusual design of the ship. Note that the wing struts serve not only to brace the wing structure, but also contribute to the lift of the ship. This two-purpose design of the strut results in a considerable saving in weight, which is reflected in the weight-lifting ability of the ship.



The completed uncovered framework indicates close adherence to the large plane design

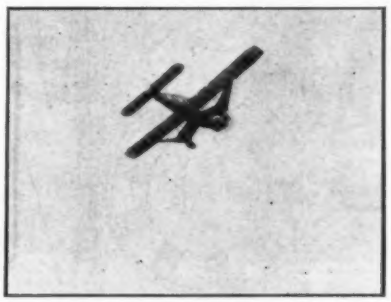
This ship is well adapted for model work. The long nose moment allows the model to be built with a natural balance—that is—the finished model will not require any additional weight in the nose to balance it (providing of course, that you use the proper grade of materials.) This eliminates dead weight, which detracts from the efficiency of the ship.

This model is very stable due to the large dihedral angle formed by each lower wing stub and the lifting strut. Two other important factors that contribute to the stability of the ship are that the center of lateral area is almost exactly on the thrust line, while the center of gravity is slightly below the thrust line. The cathedral angle, formed by the lower wing stubs and the bottom of the fuselage, permits easy landings, due to the cushioning effect of this arrangement. Not only is the model a good flyer, but it also looks good, as you may judge from the accompanying photographs.

Following is the suggested procedure for building the model:

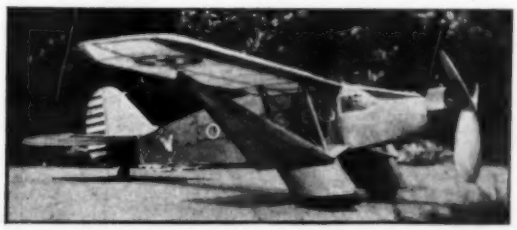
General Instructions

Study the drawings and read the instructions before starting actual work on the ship. Strive for accuracy and neatness of workmanship. When building the ship, be sure to use the grade of materials specified as this has a great deal to do with the balance of the finished model.



An actual photograph of the model in full flight

Sand each piece of wood that goes into the model. This will remove the "whiskers" which have no structural strength, yet burden the ship with useless weight.



Embodying many realistic details of the full scale plane, it provides a real thrill when in flight

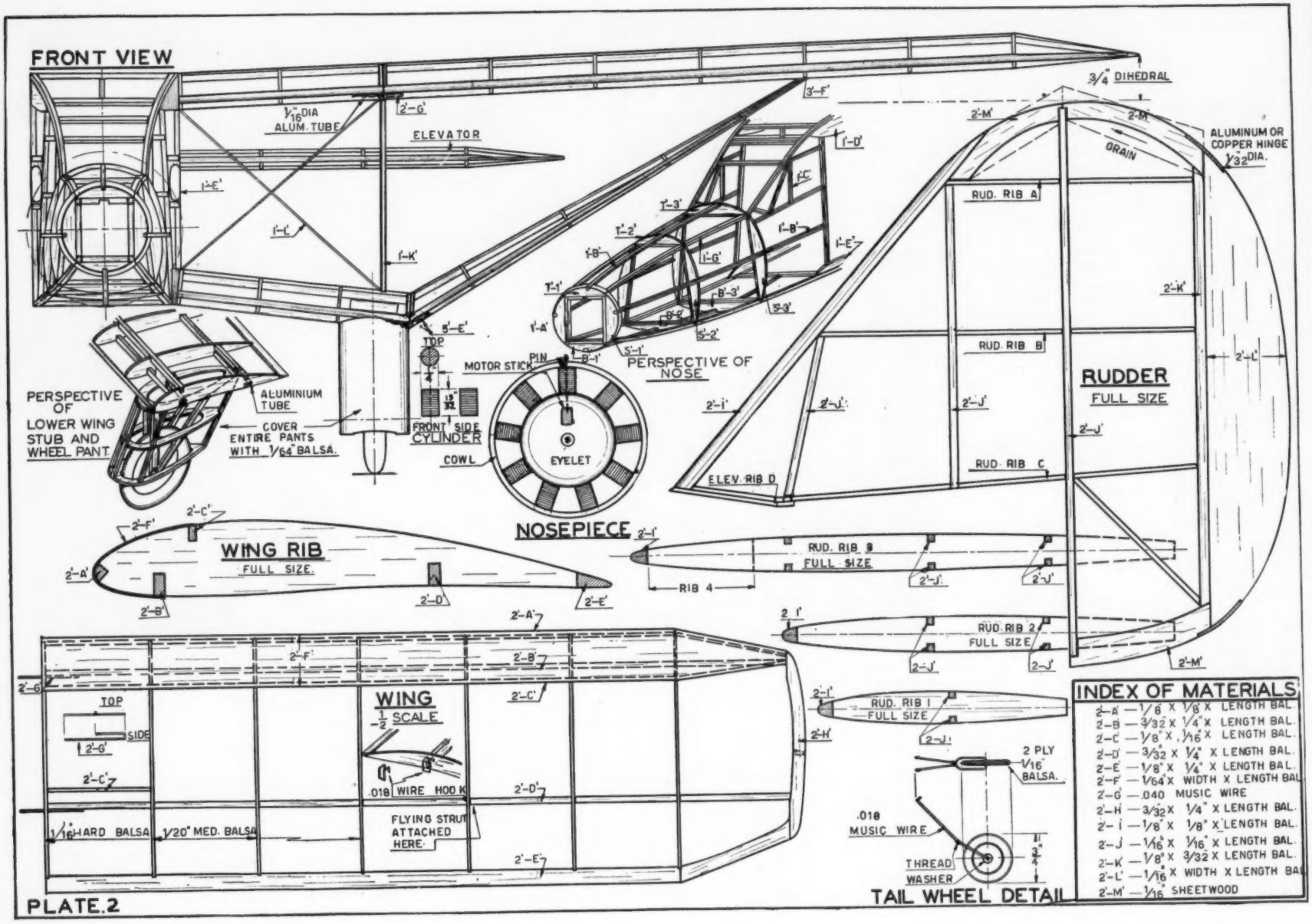
Fuselage

In order to build the fuselage, you'll have to round up a soft board (about 8" x 24"), some drawing paper, pins and some wax paper, or better yet, a wax candle. Tack the drawing paper to the board and lay out the fuselage side. You do this by drawing the base line of the fuselage about one inch from the long edge of the board, then dropping a perpendicular from that line about 2" from the left side of the board. This perpendicular to the base line will determine the position of Station 1. Drop the perpendiculars from the base line that will determine the positions of the other 10 Stations (Plate 1—Side View).

From the base line, measure down on each perpendicular the distance indicated on the plan, and make a dot there. When you have done this to all eleven perpendiculars, connect the dots, using the same curve as shown on plan. Thus you have the top outline of the fuselage side. To obtain the bottom outline, measure down on each perpendicular the distance indicated on the side view of the plan, plus $\frac{3}{16}$" and make a dot there. (The dimensions given between the top and bottom longerons are for the vertical struts only. In order to get the bottom outline of the fuselage, we must add the top and bottom longeron thicknesses, 3/32" + 3/32", to the vertical strut dimensions. Hence the "plus $\frac{3}{16}$"! When this has been done to all eleven stations, connect the dots, using the same curve as shown on plan. Now that you have the top and bottom outlines of the fuselage side, draw the various vertical and diagonal struts into place and you are ready to start work on the model. (Note! The portholes are put into place after the two sides have been assembled.)

Either lay a sheet of wax paper over the drawing, or else rub the drawing with the wax candle previously mentioned. This will prevent the "work" from sticking to the drawing as you cement each joint. Make a pin jig for the fuselage side by pushing pins on each side of each longeron at strategic positions. As you cut either a longeron or strut to size for the

(Continued on page 29)

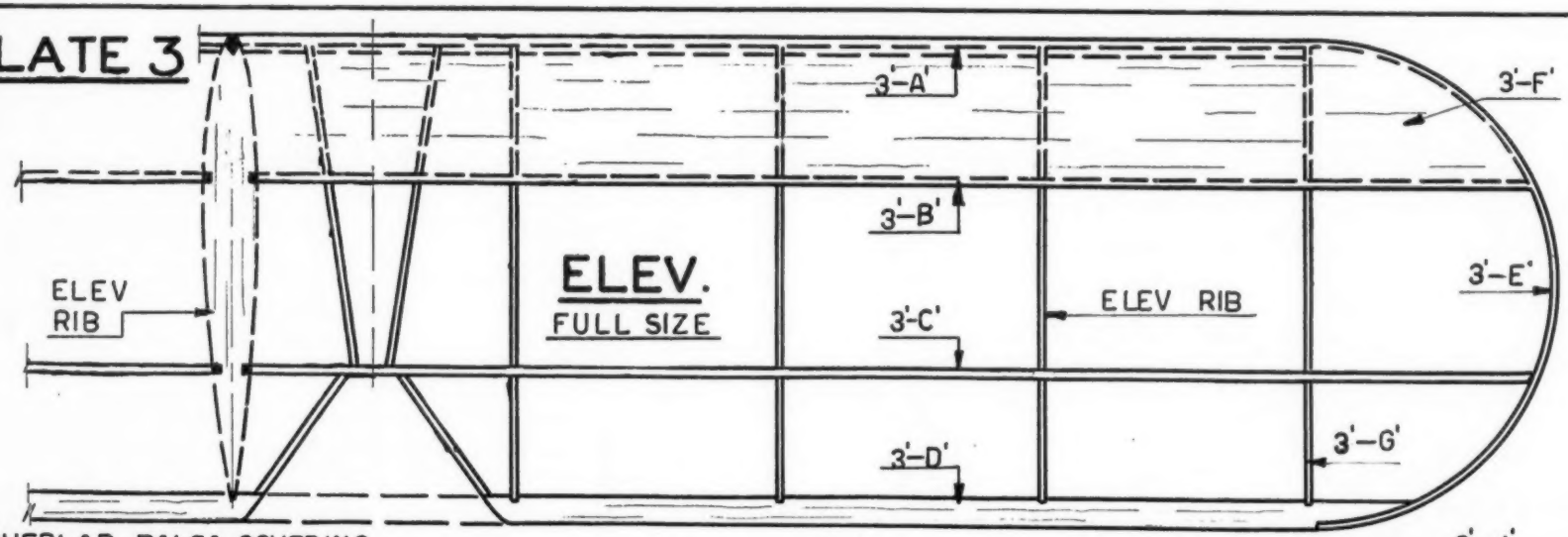


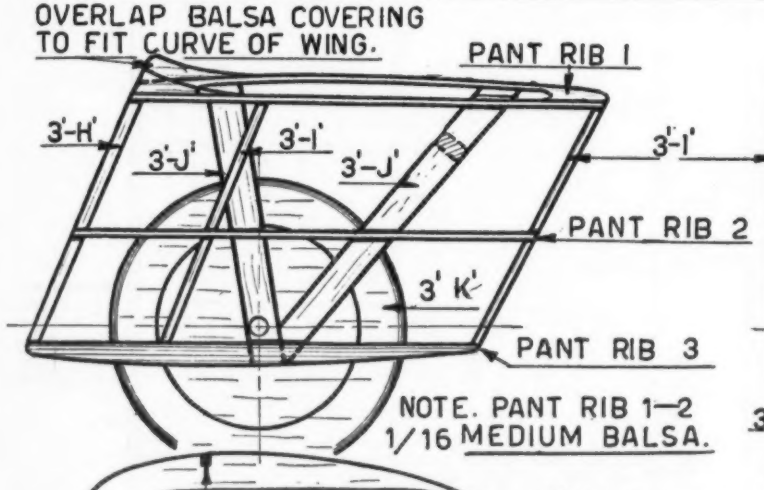
INDEX OF MATERIALS

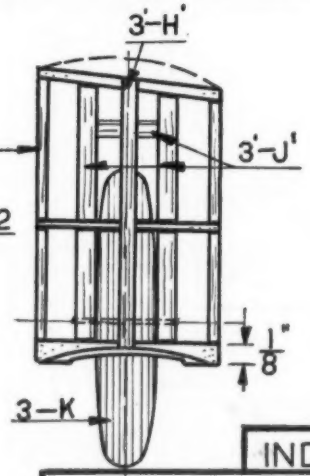
2-A	— 1/16" X 1/8" X LENGTH BAL.
2-B	— 3/32" X 1/4" X LENGTH BAL.
2-C	— 1/8" X 1/16" X LENGTH BAL.
2-D	— 3/32" X 1/4" X LENGTH BAL.
2-E	— 1/8" X 1/4" X LENGTH BAL.
2-F	— 1/64" X WIDTH X LENGTH BAL.
2-G	— .040 MUSIC WIRE
2-H	— 3/32" X 1/4" X LENGTH BAL.
2-I	— 1/8" X 1/8" X LENGTH BAL.
2-J	— 1/16" X 1/16" X LENGTH BAL.
2-K	— 1/8" X 3/32 X LENGTH BAL.
2-L	— 1/16" X WIDTH X LENGTH BAL.
2-M	— 1/16" SHEETWOOD

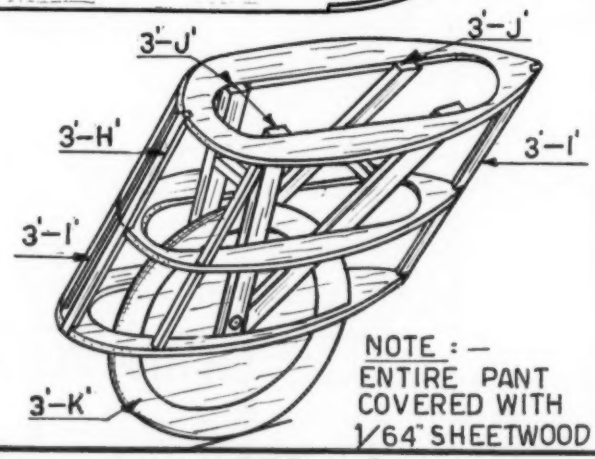
PLATE.2

PLATE 3











INDEX OF MATERIALS

3'—A'	1/8" X 1/8" X LENGTH BAL.	3'—G'	1/20" SHEET WOOD
3'—B'	1/16" X 1/16" " "	3'—H'	3/32" X 3/32" X LEN.
3'—C'	1/16" X 1/16" " "	3'—I'	1/16" X 1/16" X LENGTH
3'—D'	3/16" X 1/16" " "	3'—J'	3/16" X 1/8" X LENGTH
3'—E'	3/64" DIA. BAMBOO	3'—K'	3/8 X 1 3/4" DIA. BAL.
3'—F'	1/64" BALSA COVERING		

PLATE 4

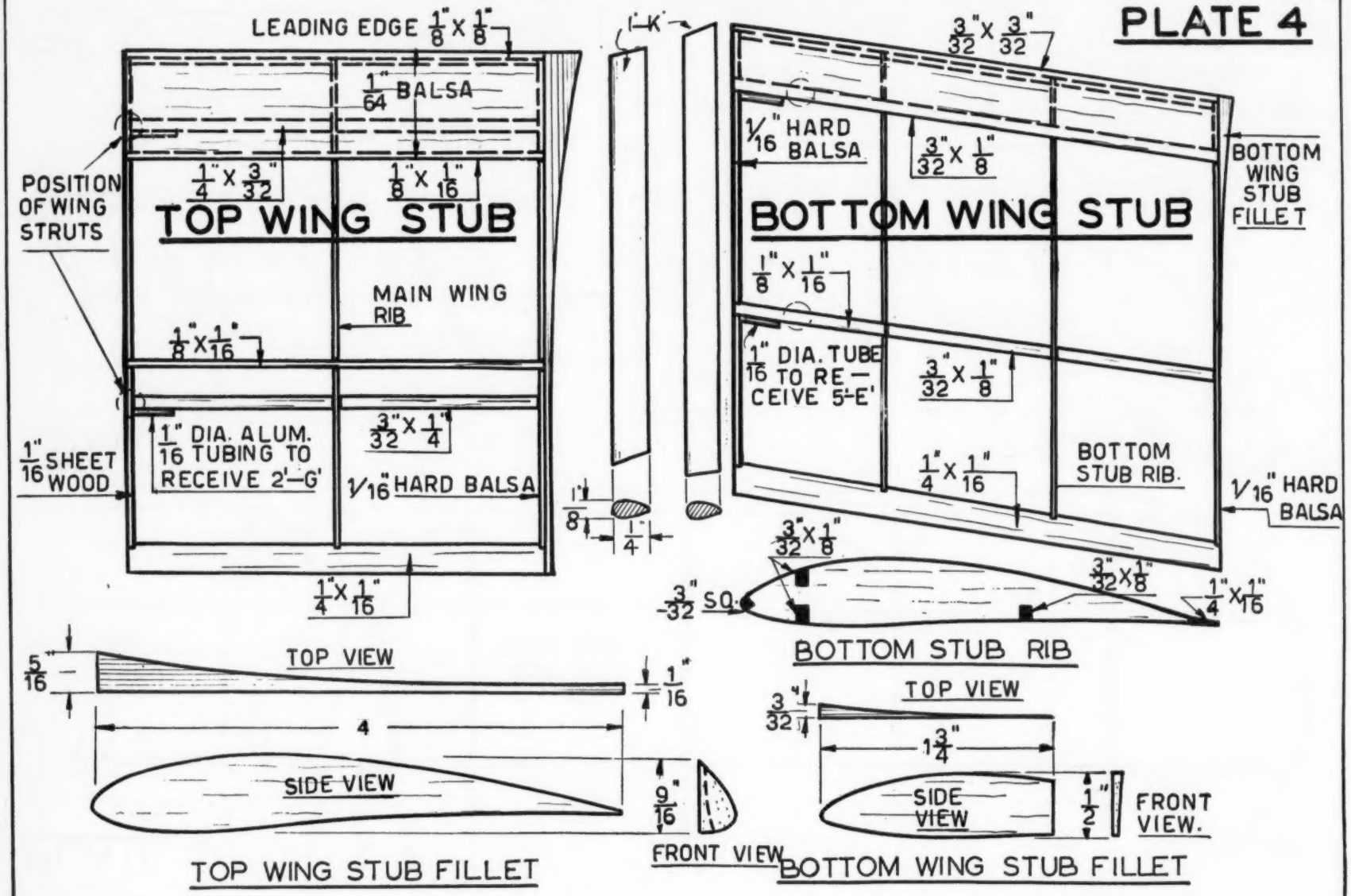
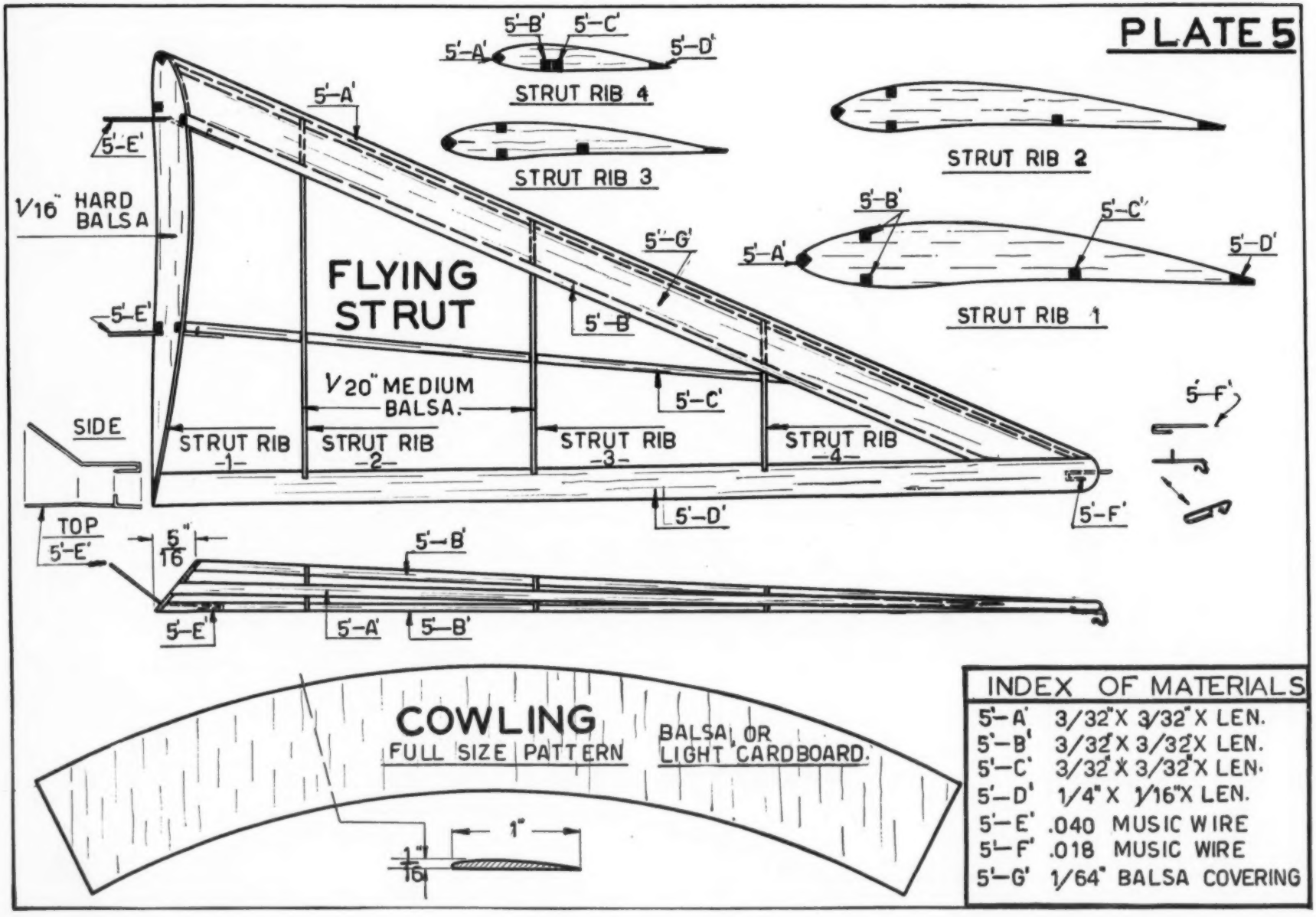
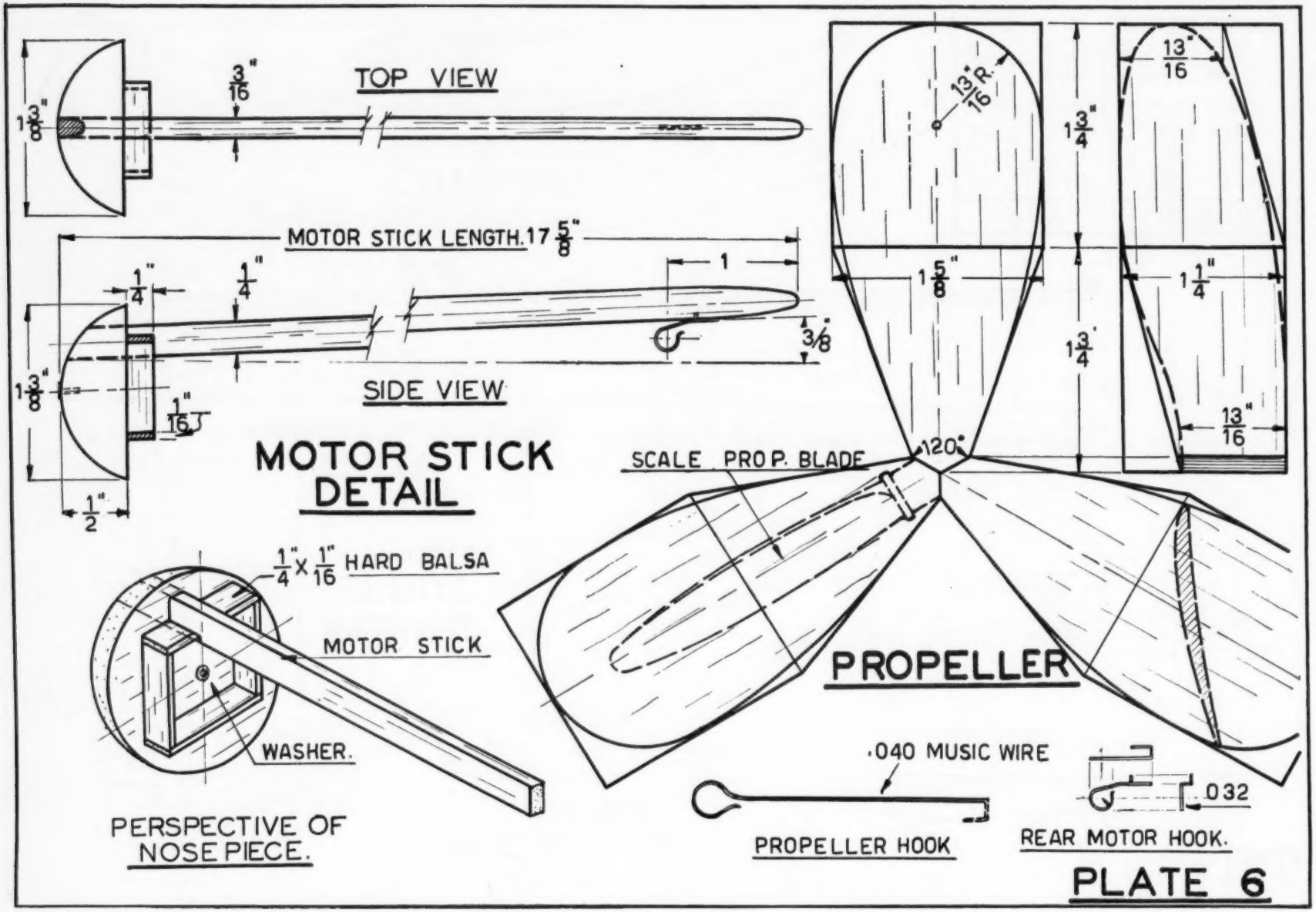

LEADING EDGE 1/8" X 1/8"
1/64" BALSA
POSITION OF WING STRUTS
1/4" X 3/32"
1/8" X 1/16"
TOP WING STUB
MAIN WING RIB
1/8" X 1/16"
1/16" DIA. ALUM. TUBING TO RECEIVE 2'-G'
3/32" X 1/4"
1/16" SHEET WOOD
1/16" HARD BALSA
1/4" X 1/16"
I'-K'
1/8"
1/4"
3/32" X 3/32"
1/16" HARD BALSA
3/32" X 1/8"
BOTTOM WING STUB
BOTTOM WING STUB FILLET
1/8" X 1/16"
1/16" DIA. TUBE TO RECEIVE 5'-E'
3/32" X 1/8"
1/4" X 1/16"
BOTTOM STUB RIB.
1/16" HARD BALSA
3/32" X 1/8"
3/32" SQ.
3/32" X 1/8"
1/4" X 1/16"
BOTTOM STUB RIB
5/16"
TOP VIEW
1/16"
4
SIDE VIEW
9/16"
FRONT VIEW
TOP WING STUB FILLET
3/32"
TOP VIEW
1 3/4"
SIDE VIEW
1/2"
FRONT VIEW.
BOTTOM WING STUB FILLET

PLATE 5



INDEX OF MATERIALS	
5'-A'	3/32" X 3/32" X LEN.
5'-B'	3/32" X 3/32" X LEN.
5'-C'	3/32" X 3/32" X LEN.
5'-D'	1/4" X 1/16" X LEN.
5'-E'	.040 MUSIC WIRE
5'-F'	.018 MUSIC WIRE
5'-G'	1/64" BALSA COVERING


TOP VIEW
1 3/8"
3/16"
MOTOR STICK LENGTH. 17 5/8"
1"
1/4"
1/4"
1
3/8"
SIDE VIEW
1 3/8"
1/16"
1/2"
MOTOR STICK DETAIL
1/4" X 1/16" HARD BALSA
MOTOR STICK
WASHER.
PERSPECTIVE OF NOSE PIECE.
13/16" R.
1 3/4"
1 5/8"
1 3/4"
13/16"
1 1/4"
13/16"
SCALE PROP. BLADE
120°
PROPELLER
.040 MUSIC WIRE
PROPELLER HOOK
.032
REAR MOTOR HOOK.
PLATE 6

A Flying Bellanca Aircruiser

(Continued from page 23)

right side of the fuselage, make an exact duplicate of that part for the left side and lay it aside until you have finished the first side and taken it out of the jig. All you have to do to make the second side is to assemble the parts you have made previously. This process makes it possible to get the two fuselage sides exactly alike. The longerons and struts are made of 3/32" sq. medium hard balsa, sanded smooth. The struts at Station 1 are 3/32" x ¼" medium hard balsa. Set the longerons into the pin jig, then fit and glue into place all of the vertical and diagonal struts except those at Stations 4 and 5. Make a metal or hardwood wing rib template and another template for the bottom wing-stub rib. Using these templates, make 2 ribs of each kind, using medium soft 3/32" thick balsa. Shape these ribs to fit against the fuselage longerons as shown in Side View, Plate 1, then glue them into position. You can now cement the struts for Stations 4 and 5 into place. Make an elevator rib template and using it as a pattern, shape the 3/32" x ¼" medium balsa strip that is used for the elevator cradle, then cement it into place.

When you have the two fuselage sides done, assemble them as shown in Top View, Plate 1, taking care to square the job up right. Note Station 4, 5, 10 and 11 details. The fuselage formers are made of medium soft balsa. After you have shaped them and cemented them into place, the stringers 1-B, made of 1/16" sq. medium balsa, are assembled into position. Make the porthole frames 1-F, using 1/32" sheet balsa, medium grade. The windows should be made of a light grade of celluloid, cut just 1/16" larger in radius than the openings for the portholes (see drawing), then cemented to the side of the porthole frame which is to face the interior of the fuselage. Glue the completed porthole frames into place. The windows for the pilot's compartment may be covered with either light celluloid or cellophane.

The next step is to make the motor-stick (Plate 6). First make a "square" which is to fit into the nose of the ship (1/16" x ¼" medium balsa). Select a light piece of balsa for the nose block (1⅜" sq. x ½") and cement it firmly to the "square." When this is dry, fit the "square" into the nose of the fuselage, carve and sand the block to the correct shape. (If you intend making a scale prop for your model, make two of these nose-plug units, one for the flying prop and one for the scale prop.) The motor-stick is made of 3/16" x ¼" x 17⅝" hard balsa. Sand this stick, then give it a couple of coats of dope, which will serve to strengthen it. Cut a small section out of the "square" and make a hole through the nose block as shown on plan, then push the motor-stick into place and cement it there. The prop bearing consists of an eyelet glued to the front of the nose block and a washer at the rear of the block. The rear hook is made of .032 music wire. Should your motor-stick bend excessively when the rubber motor is tightly wound, make a wire can (.028 music wire) and cement it to the center of the motor-stick. Now that you have the motor-stick finished, you can cover the nose of the fuselage with 1/64" medium soft balsa. The top of the fuselage is covered as far as Station 3, while the bottom and sides are covered as far as Station 4.

The tail-wheel is made of ⅛" medium balsa (Two 1/16" sheets glued together cross-grained) and has a washer cemented to each side of the hub. The wire fitting (Plate 2) is made of .018 music wire. Cement the unit to the fuselage as shown in the perspective detail on Plate 1. Check the glue joints of the fuselage and reinforce all those that may need it with another coat of cement.

Tail Frames

Using the rib template you made for shaping the elevator cradle for the fuselage, make 10 elevator ribs, using medium balsa 1/20" thick. Notch the ribs as shown (Plate 3), then make the leading edge (medium balsa), the spars (hard balsa) and the trailing edge (hard balsa). Mark the position of the ribs on the leading edge and the trailing edge, then make 1/32" notches in the trailing edge to receive the ribs. Start assembling the frame by cementing the ribs to the leading and trailing edge. (Note—the trailing edge is kept in one piece until the entire frame is finished—after which the center section is cut away for the rudder clearance.) Cement the spars into place. The tips are made by bending a 3/64" x ¼" strip of bambo to shape over a candle or other flame, then splitting off a couple of 3/64" strips and rounding them. After the tips are glued into place, cut away the center section of the trailing edge as mentioned above, then cover the leading section of the elevator with 1/64" med. soft sheet balsa. The rudder (Plate 2) is made using the same procedure as for the elevator. The controlling flap is fastened into place by means of a piece of aluminum or copper wire 1/32" dia., which is glued into place as shown on plan.

Main Wings (Plate 2)

The main wing is made in the same manner as the elevator. The leading edge, spars, tip and 1/20" thick ribs are all made of medium balsa, while the 1/16" end rib and the trailing edge are made of hard balsa. After the main wing frames are done, cover the leading sections with 1/64" thick medium soft balsa, then glue wire fittings 2-G and the flying strut attachment hook into place.

Top and Bottom Wing Stubs (Plate 4)

The top and bottom wing stubs are also made in the same manner as the elevator except that the bottom stubs have a false spar just over the rear spar at the end section adjoining the flying strut. There is a filler block between the false top and the bottom spars which serves to transmit the landing shock to struts 1-K, and so up to the main wing. (See Front View, Plate 2). To make the stub fillets, cement the blocks to the ends of the wing stubs first, then shape them as shown on plan. Glue the 1/16" aluminum tubes to the spars, then check their position by sliding the main wing into place and seeing that it lines up all right.

Flying Struts (Plate 5)

The flying struts are also similar in construction to the elevator. Note that the end rib is set at an angle. Cement wire fittings 5-E into place. (Fitting 5-F is cemented into place as the ship is assembled.

Landing Gear (Plate 3)

Make pant ribs 1, 2 and 3 using a medium grade of balsa. Assemble each pant as shown in Side View, making one left and one right. Note that the top rib is set at an angle so as to conform with the wing stub angle (see Front View—Plate 2). Make the landing struts 3-J. Glue the front and rear struts together, forming a "V" as shown in the Side View. Cement a washer to each side of the front strut, then glue each "V" into the pant frame as shown in the perspective view. Cement the cross-brace into place. Note that the tops of the "V" struts are flush with the top of the rib. The wheels are made of 3-ply balsa (three ⅛" sheets of medium balsa glued together cross-grained). Cement a washer to each side of the wheel hub, then paint the "tire" black and the center orange (or any other color you may prefer). After the wheels have been painted, put them into position between the "V" struts of the landing gear, pass a pin thru the struts and wheel, then cement the pin into place.

Covering

Cover the fuselage with blue tissue, then spray it with water. After it has dried, give it two coats of clear dope. Using some light writing paper, cut out 12 circular rims, having an O.D. of 9/16" and an I.D. of ⅜", and cement one to each porthole. (See accompanying photographs). Using the same type of paper, cut some strips 1/16" wide and cement them around the front windows.

The elevator, main wings, top and bottom wing stubs and the flying struts are covered with yellow tissue, and treated the same way (water sprayed, then two coats clear dope). The rudder may be entirely covered with yellow tissue, or if you wish to have army rudder bars on it, cover the part forward of the main spar with yellow tissue, and the part rear of the main spar with white tissue. Cut some ¼" wide strips of red tissue and dope them to the white tissue of the rudder at ¼" intervals, parallel to the ribs, then dope a strip of blue tissue about ⅛" wide just over the main spar.

Assembly

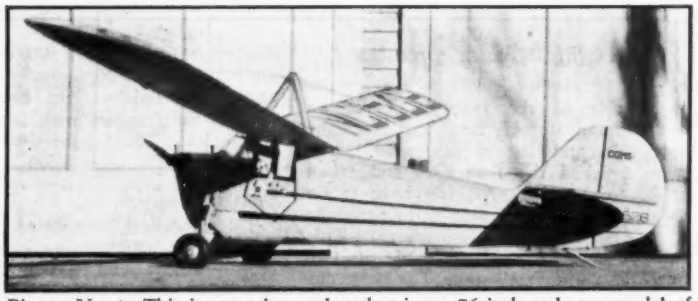
Cement the elevator into its cradle at the rear of the fuselage, then glue the rudder into place. Take care to line them up properly. Join the main wing and the upper wing stub as shown in Front View, Plate 2, using a drop of cement at the leading and trailing edge of the joint. Now, using a table or any other cleared surface, we'll make an assembly jig. This is done by laying the fuselage on the table and propping up the rear end so that it is

(Continued on page 58)

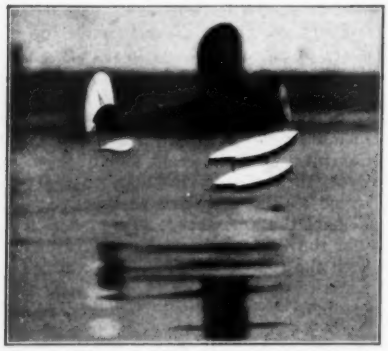
"Gas Lines"

Latest News of Members of the International Gas Model Airplane Assn. From All Parts of the World

The I.G.M.A.A. Pin



Picture No. 1. This is not a large plane but just a 76 inch scale gas model of an Aeronca, built by Richard Mesner of Chicago, Ill.



Picture No. 6. Mr. Broughton's Bunch "Scorpion Major" seaplane in full flight after a take off

AT THE time this is being written the model builders are preparing frantically for the annual International Gas Model Airplane Association Contest at Hadley Field, N.J. Indications are that approximately 300 contestants will be on hand to compete for a long list of prizes. The contest is to be sponsored by Kresge Department Store of Newark, New Jersey. This organization has established the Kresge Trophy as first prize for the limited fuel duration event. This is to be passed on to the winner of this event each year.

To Messrs. Irwin and Nathan Polk go the credit of popularizing the limited engine run event in the east. Unit No. 7, of which Mr. Irwin Polk is the leader, has held several successful contests in which this type of flight was made exclusively. It has become very popular with gas model fans. Because of this the Polk brothers feel warranted in establishing a very beautiful trophy to be given as first prize at the annual I.G.M.A.A. Contest for the limited engine run event. This trophy stands about thirty-six inches high and should be treasured highly by anyone who wins it. It will be held for a year by any winner and will then be passed on to the next winner. However any winner who passes on the trophy will retain an exact miniature of it which he may keep always. This miniature is about twelve inches high.



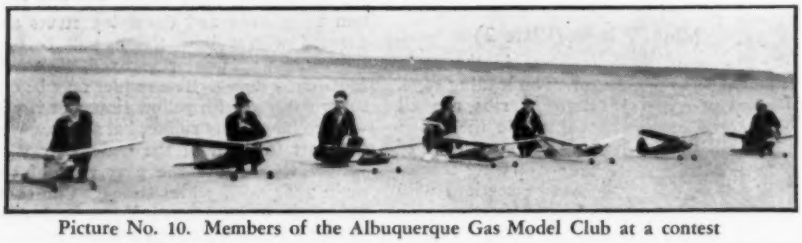
Picture No. 9. Mary Fowler, vice-pres. of the Boston Gas Model Society, with Hewitt Phillip's gas model

Next month pictures of these trophies will appear in "Gas Lines." We wish to state that the whole I.G.M.A.A. organization is very much enthused about the Kresge Department Store Trophy and the Polk brothers donations.

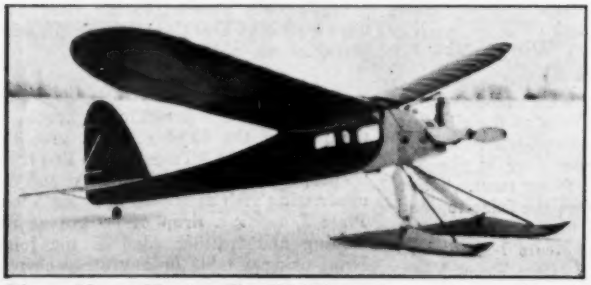
At the time of reading this the contest will have been a thing of the past and many model fans, especially those who attended the contest, will know the results. It will be required that others wait until the August issue to read the intimate details in MODEL AIRPLANE NEWS. We beg your patience until that time.

"Gas Lines" would not be complete without a number of pictures and stories about some of the interesting models which have been brought to our attention by their builders this month. One of the most unusual and interesting jobs is an exact scale gas model of the Aeronca, which was built by Richard Hamton Mesner of A-2200 Insurance Exchange, Chicago, Illinois.

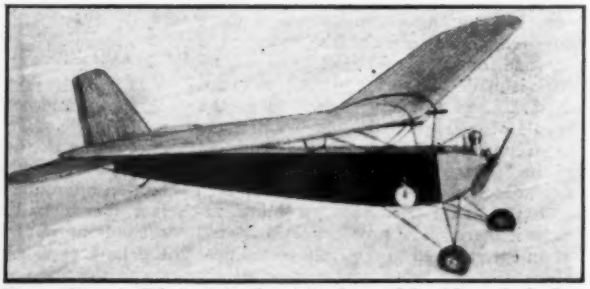
It is shown in picture No. 1. This little ship is powered with a 1/6 hp. Mighty Midget engine and has a wing span of seventy-six inches. Its weight is three pounds, four ounces, complete. One of the unique features is the working landing gear with an oleo stroke of two and a half inches. The cowl has inspection holes on either side to permit repairs and the wings may be taken off or put on in a very few minutes. They fasten on just like the wings on the original large ship. On its first flight the ship flew beautifully for about six and a half minutes, reaching an altitude of between 400 and 500 feet. Unfortunately the plane landed in the top of a large tree. When it was retrieved it was found to have suffered two badly damaged wings which had to be recovered, a few rips in the body and a blown tire.



Picture No. 10. Members of the Albuquerque Gas Model Club at a contest



Picture No. 3. Here's a Sky Chief that refuses to be snowbound. It takes off beautifully and is the brain child of Jack Christ



Picture No. 4. Edwin Schunke's 7½ ft. model with a clock device on the fuselage side to act as an engine time switch



Picture No. 2. Fred Gerling's model (left) and George Ginn's taper wing job on their flying field at Columbus, Ohio

George W. Ginn, secretary of the Advanced Model Aviation Society of 2494 North 4th Street, Columbus, Ohio, writes and tells us of the activities being carried on by this unit. Mr. Ginn sends us picture No. 2, which shows two of the gas jobs of the club, The large one was built by Mr. Ginn and the smaller one by Fred Gerling. They are very nice looking jobs. to say the least. From the looks of Gerling's model it should be an exceptionally stable ship, with its high line of thrust and much of its lateral area placed below the center of gravity. Members of this club must be eighteen years or over. It was organized about two years ago and at the present time there are about twenty active members.

One of the interesting features appearing this month is picture No. 3, which shows Mr. Jack Christ's "Sky Chief" on skiis. Mr. Christ lives at 637 South Shilling Avenue, Blackfoot, Idaho. It is not known how many gas model builders have tried skiis on this job, but this one has worked very successfully and many fine flights have been made. Mr. Christ says the ship takes off unassisted in about a twenty-five foot run, which is quite remarkable inasmuch as the altitude at Black Foot is 4500 feet. The little ship is powered with a Baby Cyclone engine.

Edwin Schunke of 1124-4 Avenue North, Fargo, North Dakota, sends us picture No. 4 which shows his seven and a half foot; three pound, one ounce; Cleveland, Tom Thumb powered gas model, which has made as many as sixty-two successful flights. As many as twenty-four flights have been made in one day in temperature ranging down to sub-zero. Mr. Schunke has had no trouble in starting his motor at this temperature after it had been heated by an alcohol flame. On one occasion trouble was experienced, apparently because the flashlight batteries froze up. One of the unique features of the model is the home-made timer, which shows in the picture at the bottom of the fuselage near the front of the model. It is made from the works of a small alarm clock and it weighs only two ounces. Mr. Schunke says:

"After having to chase the model a mile and a half through snow drifts up to three feet deep, and the model finally flying out of sight on less than a tank of gas when I forgot to operate the timer, I realized how necessary it was to have a timer to get full enjoyment out of gas modelling."

(Editor's Note: Next month drawings and instructions will appear which will enable expert builders to make their own timers out of clock works. It is a very simple and reliable device.)

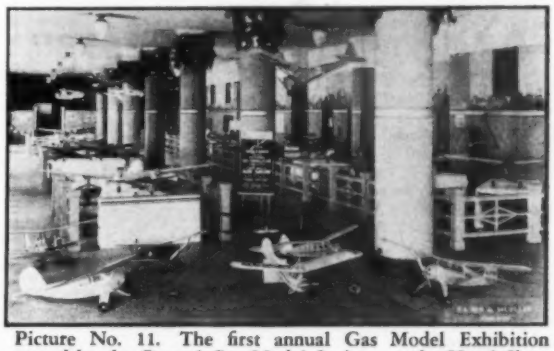
Paul Zakim's job, which he flew at so many contests, proved to be a "cat in the bag," for he was never able to fly it successfully at any of the contests. At the last I.G.M.A.A. contest it cracked up. Now, Henry Clark lets the "cat out of the bag" by telling us of Mr. Zakim's new job which he designed himself and upon which he has worked diligently during the winter months. Zakim's new ship is shown in picture No. 5. Both Zakim and Clark live in New York City. The model shown is called the "Zeus" and has an eight foot wingspread. As yet the ship is not quite finished, as it must still be covered and painted, but it gives promise of good performance.

Lately we notice that most of the ships that are being designed run to looks rather than to a type of design which will

(Continued on (page 58)



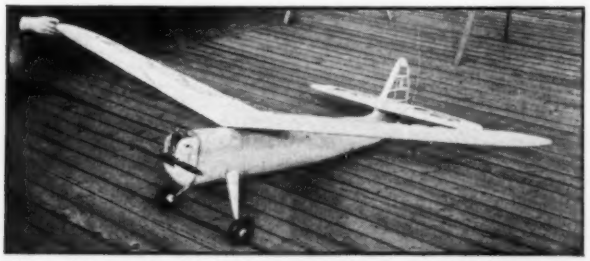
Picture No. 7. Dick Korda's job causes some anxious moments after a fast take-off



Picture No. 11. The first annual Gas Model Exhibition staged by the Central Gas Model Society, at the Hotel Sherman, Chicago. Over fifty gas models were exhibited



Picture No. 12. Claud Woodworth's racing gas model. It is exceptionally well designed with a high thrust line, giving speed



Picture No. 5. A monocoque gas model designed and built by Paul Zakim, which supercedes Mr. Zakim's job that unfortunately cracked up



Picture No. 8. A few gas jobs on the sidelines and part of the crowd at the San Diego Contest held on April 4th. Alan Cummings won

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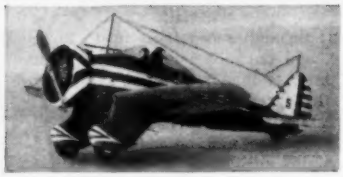
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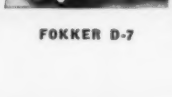
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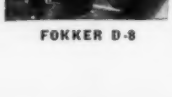
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WACO C-3 CABIN



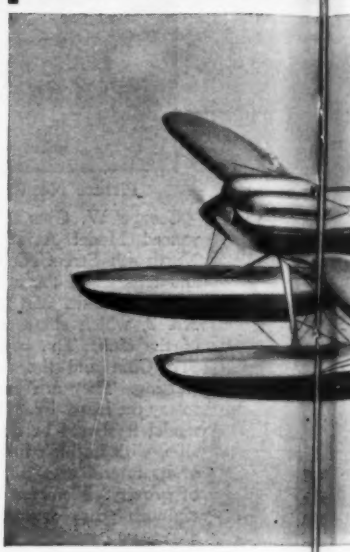
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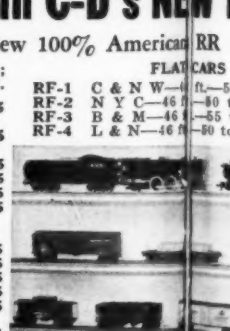
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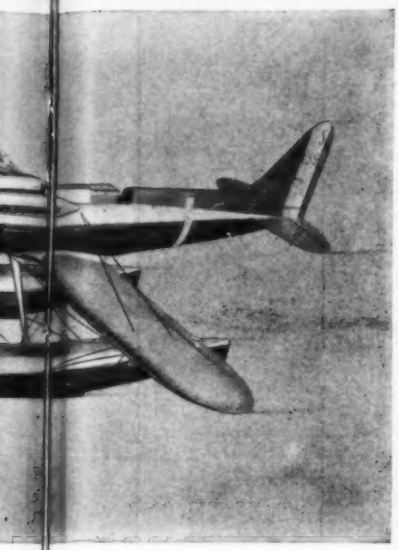
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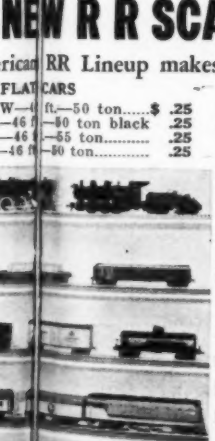
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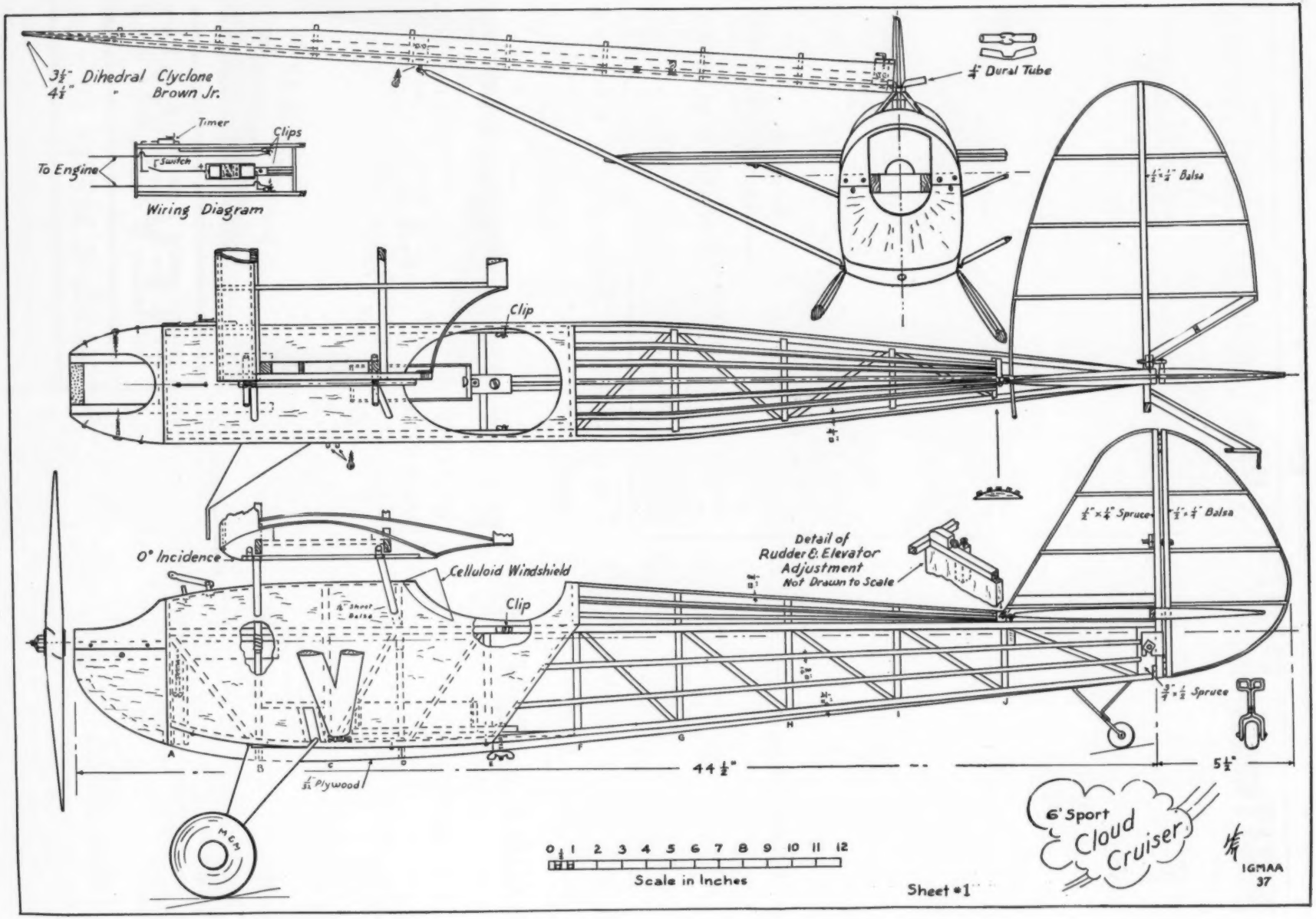
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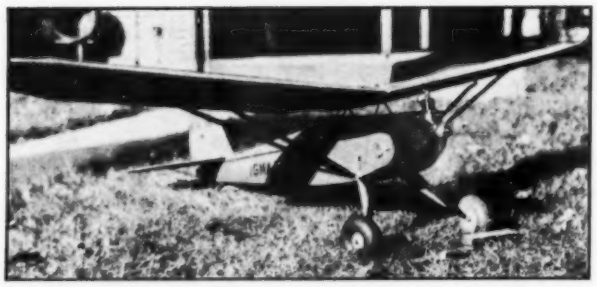
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3½" Dihedral Clyclone
4½" - Brown Jr.
Timer
Clips
Switch
To Engine
Wiring Diagram
¼" Dural Tube
Clip
¼" × ¼" Balsa
0° Incidence
Celluloid Windshield
Clip
Detail of
Rudder & Elevator
Adjustment
Not Drawn to Scale
¼" × ¼" Spruce
¼" × ¼" Balsa
¾" × ½" Spruce
44½"
5½"
A B C D E F G H I J
1/32" Plywood
0 ½ 1 2 3 4 5 6 7 8 9 10 11 12
Scale in Inches
Sheet #1
6' Sport
Cloud
Cruiser
IGMAA
37



The six foot cloud chaser warming up. Note the trim landing gear and realistic lines

How to Build a Cloud Cruising Gas Model

Complete Instructions for You to Build the "Perfect" Gas Model—Very Stable—Not Too Large—Fine Performer

By HARRY EDWARD MOYER

THE CLOUD CRUISER is a consistent flier, very stable and easily adjusted for flight. It has a quick take-off (R.O.G.), rapid climb, a good glide and slow landing speed.

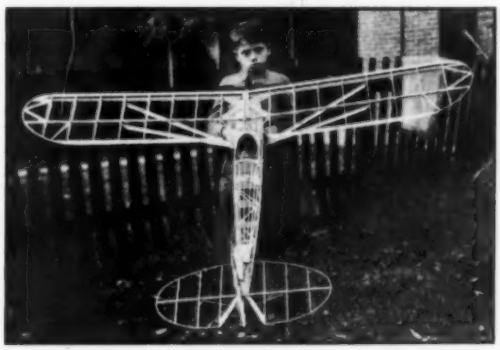
It has a wing span of seventy-two inches, a length of fifty-one inches and weighs three pounds, twelve ounces. The construction is balsa except in a few places where stresses require harder wood.

The landing gear is full cantilever. It has a 1¼" shock travel, and can take very rough landings.

A Brown Jr. furnishes the power, but a Baby Cyclone or any other "popper" in that power class can be used. The engine, tank, coil and condenser are mounted on a base which is removable by loosening one screw and two wires.

This model is so constructed that it may be knocked down or assembled in a few minutes. The wing, rudder and elevator can be removed or replaced without disturbing their settings. This feature makes the model easy to carry for it can be packed in an automobile trunk.

Equipment includes mechanical timing; a shock-proof wing with drag adjustments on the "V" struts; fin and rudder with independent torque and direction settings; and a movable elevator. Balance is obtained by sliding the battery box.



The uncovered framework of the model and its mascot, the author's young brother

Construction

Building the Cloud Cruiser is not very difficult, but it is advisable to study the plans carefully and make full scale layouts on stiff paper or cardboard. Read the instructions thoroughly and compare them with the drawings.

It is advisable to make the fuselage first. Medium weight balsa, spruce, ash and aircraft plywood were used, but white pine may be substituted.

Spruce is used for the longerons, uprights and cross-pieces between bulkheads "A" and "D"; balsa from "D" to the tail post. Cement and pin all joints. To prevent splitting it is advisable to drill small holes in hardwood first before pinning or tacking.

Bulkhead "A" is plywood with an opening just large enough for the engine mount to slide through. It has a sheet aluminum oil wall, cut the same shape and fastened to the front with small wood screws. On the back, cement and tack a block. Bore a ⅛" hole lengthwise and counter-bore one half this length with a ¼" bit. Into this hole place a number 6 wood screw, two inches long, to lock the engine mount in the fuselage.

The engine mount extends through station "B". These uprights should be cut out so that the line of thrust is zero. The landing gear bearing should come below the bottom cross-bar. Cement and bind thoroughly. Cut out the lower former to fit over this binding. The front cabane struts are fastened to the uprights at this station. Pass the binding through the holes drilled for this purpose.

A dowel forms the lower cross-bar at "C". Place this dowel ¼" forward and brace with triangular hardwood blocks. No lower former is used here. The rear part of the landing gear must come directly above this dowel. Bind with rubber—a yard of ¼" narrow fabric elastic makes very good shock cord. Bind the rear cabane struts to the uprights at "D".

The center of the cockpit is located at station "E". Omit the top cross-piece. Remove and replace battery box through this opening. Place the wire clips on the top longerons at this station. Stations "F" to "I" are typical.

Station "J" is sheet balsa. The elevator and fin adjusting blocks are cemented to this station. Refer to sketch on sheet number 1. These blocks are hardwood, bored and tapped for 6-32 screws. Cover the top and sides with sheet balsa, from the cockpit forward, as shown on sheet number 1. The bottom covering from "A" to "E" is plywood. This is removable and is held in place by small wood screws.

The engine mount should have just enough clearance to slide in and out of the fuselage without binding, and should be rigid when locking screw is tightened.

The nose was carved from solid balsa. If carving facilities are not available, this block can be made up from sheet balsa stock, cut to shape and joined with cement.

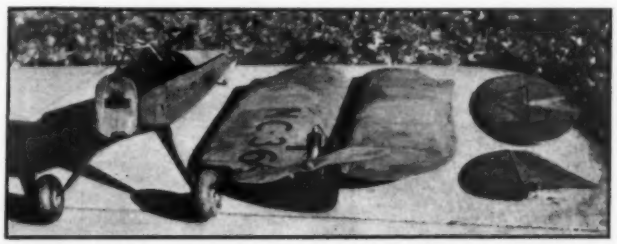
Landing Gear

The landing gear is hinged at the front. The shock travels back and upward. Bind the joints with fine wire and use plenty of solder. The fairing outline is spruce and the center, balsa. Dope and cover with cotton fabric. Airwheels are held on with dabs of solder. The tail wheel fork is shaped from a bicycle spoke. Cement and bind to the lower longerons.

Battery Box

The battery box is made of plywood and holds two batteries. Brass clips form the terminals. The wires are soldered to these terminals. The positive wire leads to the switch, then the timer, and is finally soldered to the clip on the right side of the fuselage. The negative wire is soldered directly to the clip on the left side. Allow a little slack in the wires so the box can be lifted from the fuselage when replacing batteries.

This box is moved fore and aft for balance and is locked in place by a screw which travels through a slot in the fuselage floor.

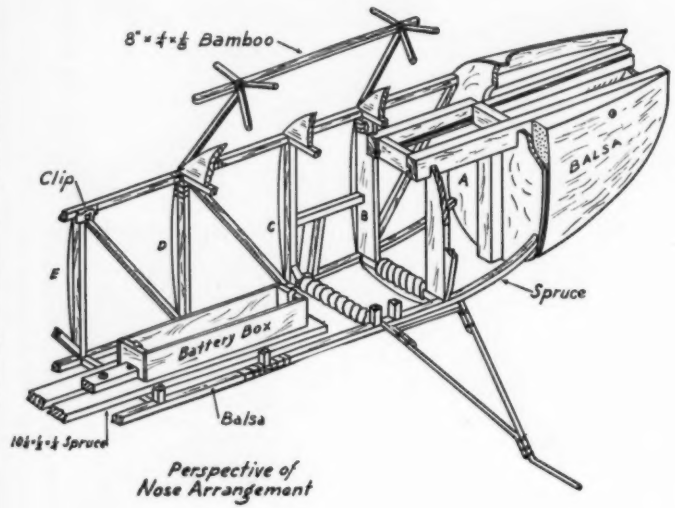


Here you see how the model is "knocked down" to make transportation easy

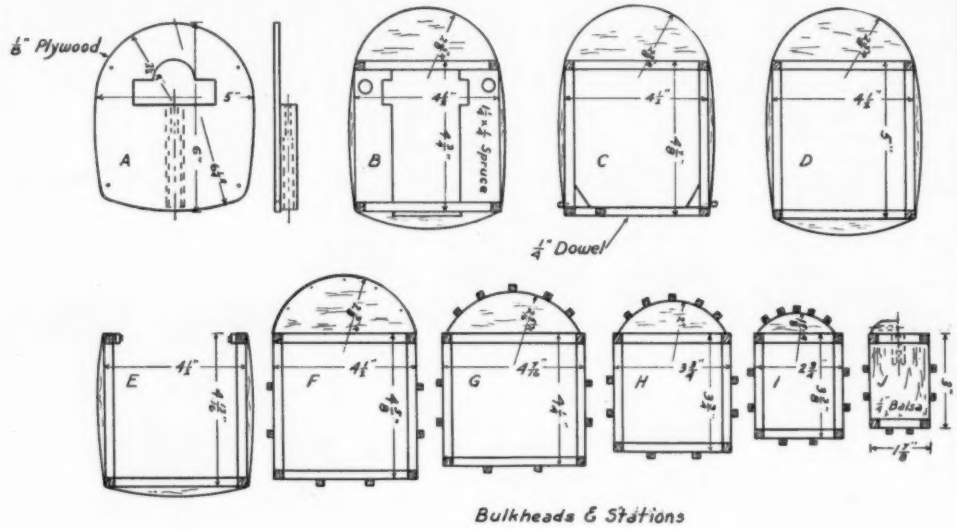
Elevator, Fin and Rudder

Although removable, the tail surfaces are of lightweight

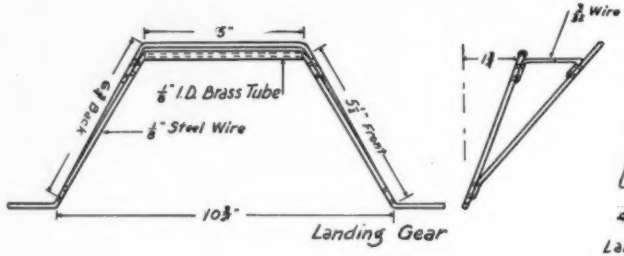
(Continued on page 48)



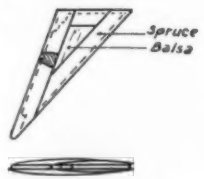
Perspective of Nose Arrangement



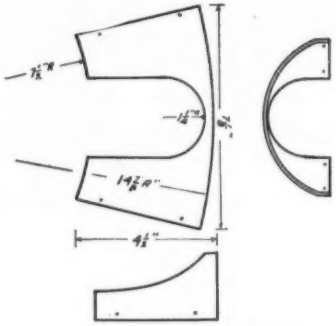
Bulkheads & Stations



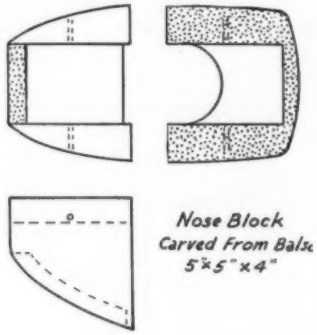
Landing Gear



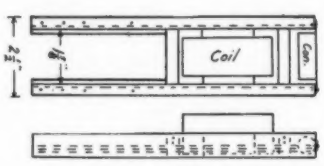
Landing Gear Fairing



Cowling - 1/32 Plywood



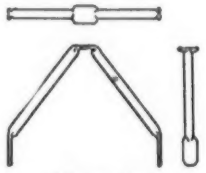
Nose Block
Carved From Balsa
5" × 5" × 4"



Motor Mount 9" × ¾ × ⅜ Ash
for Brown Jr.



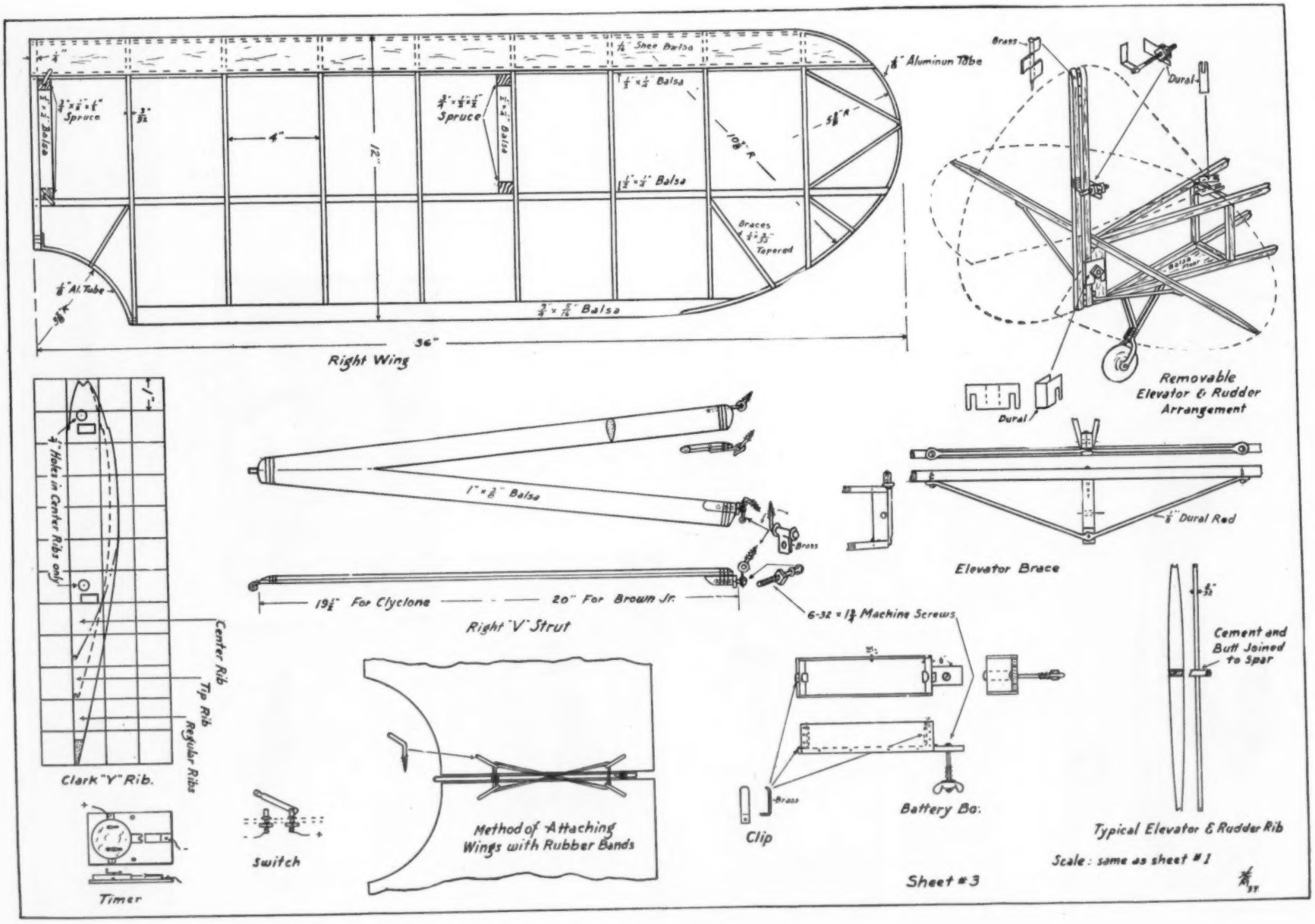
For Baby Clyclone
Motor Mount 9" × ¾ × ½"

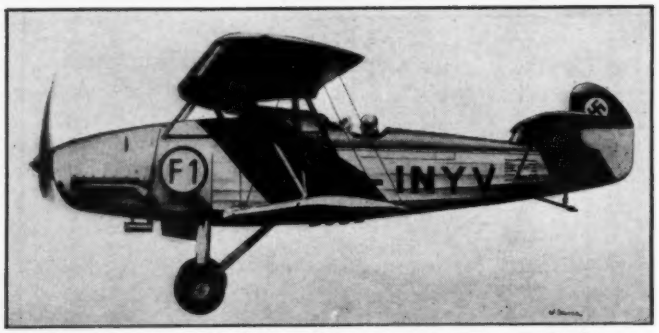


Cabane Strut
10" × ¼ Dural Tube

Scale: same as sheet #1

Sheet #2


Right Wing
36"
12"
4"
Spruce
Balsa
Sheet Balsa
Aluminum Tube
Braces
Tapered
Removable
Elevator & Rudder
Arrangement
Brass
Dural
Balsa Strut
Elevator Brace
Dural Rod
Right "V" Strut
1" x 1/2" Balsa
19 1/4" For Cyclone
20" For Brown Jr.
6-32 x 1 1/2 Machine Screws
Clark "Y" Rib.
4" Holes in Center Ribs only
Center Rib
Tip Rib
Regular Ribs
Timer
Switch
Method of Attaching
Wings with Rubber Bands
Clip
Battery Box
Cement and
Butt Joined
to Spar
Typical Elevator & Rudder Rib
Scale: same as sheet #1
Sheet #3



The German Arado 66-C training plane, by Wm. C. Drake

AIR WAYS

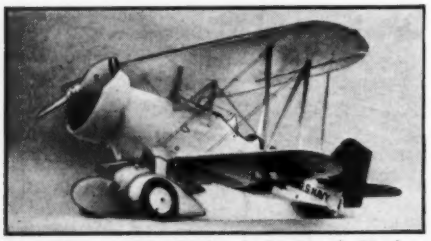
HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Tell Others What You Are Doing

Air Ways Club News

THE usual flood of mail from Air Ways Club members, telling of their activities throughout the world, has come to this desk this month. Naturally it would be impossible to print all of the comments received. However, we have selected a few which might interest you.

Our old friend William C. Drake of 3 Pine Street, Malden, Mass., crashes through again with the heading. His work appears to be getting better and better. The wash drawing this month is a picture of the Arado 66-C. It is a two place German biplane used for advanced training and is powered with a 240 hp. Argus As-18 eight cylinder inverted Vee air-cooled engine. It has a top speed of 131 miles per hour.



Pict. No. 5. This Goshawk, by Veach Hurley, flies yet is perfect in detail

Picture No. 1 was sent to us by Bill Metzger of 1547 Mars Avenue, Lakewood, Ohio. Old readers will remember that Bill has been bedridden for a long period of years. His work with models occupies most of his time, though he says the smell of the cement and paint aggravate his illness. The models shown are a series of scale models of the Thompson Trophy winners. They were built with the help of one of his very good friends. Left to right they are: Travelaire Mystery Ship, Laird Solution, GeeBee-4, GeeBee-11; Wedell-Williams 44 and 57, and the Howard "Mr. Mulligan." We are sure that Bill will be greatly pleased if our Air Ways Club members write to him.



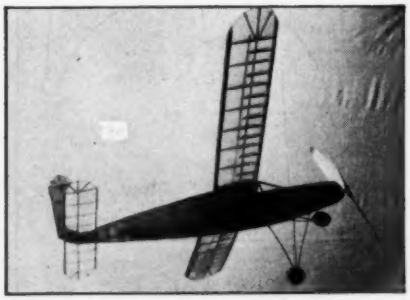
Pict. No. 4. A flying scale model Hawk P6-E, completed in 150 hours by S. P. Adams

Picture No. 2 shows a Vought V-65 with the trophy it won for Ralph Guernsey of Posey, Calif. This is a beautiful made job and it won first prize at the California State Model Contest held at Sacramento during the State Fair. It is made entirely of balsa with the wings and tails covered with tissue. All controls are movable and the cockpits are equipped with upholstered seats, safety straps, fire extinguishers, throttles and instruments. The brace wires are made of actual steel wire, not thread. Guernsey's picture rates as one of the best contributions for this month.

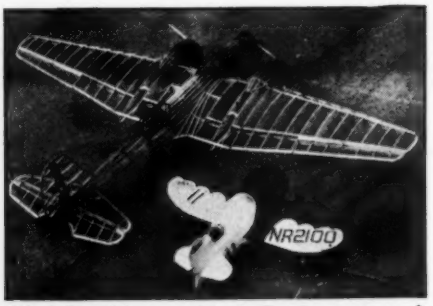
A model of equal merit is shown in picture No. 3. It is a Ryan S-T made by Kenneth Lee of Honolulu, Hawaii, and Jack Weyer of Santa Barbara, Calif. It is quite remarkable how these two fellows got together, considering the distance between the two places. Close examination will reveal that the model is made to very careful scale and the workmanship is about as perfect as possible. Even rivets are on the metal body. Unlike other models the ship is not made of wood. It is an exact miniature of the large Ryan S-T shown in the background.

Another fine scale Hawk P6-E appears in picture No. 4. This was built by Stewart P. Adams of 540-15th Avenue, Paterson, N.J. He is now attending the Lawrenceville, N.J., School and in his spare moments he occupies his mind with this type of work. It took 150 hours to complete the model, and that is not all; it is not only a scale model but a flying model as well.

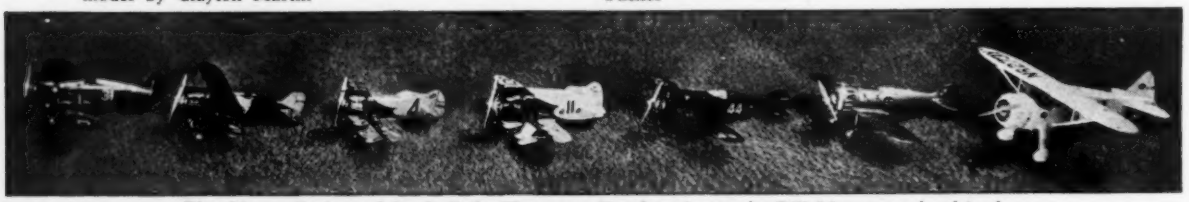
A clever modelling job by Veach Hurley of 208 High Street, Cambridge, Maryland, is shown in picture No. 5. It is a Curtiss Goshawk and a flying scale job. The motor alone contains over 500 separate parts, including spark plugs, ignition wires, cooling fins, etc. The propeller is carefully detailed, though it is a flying propeller. This is often neglected on some models. You will notice that the ship is also equipped with an auxiliary gas tank, bombs,



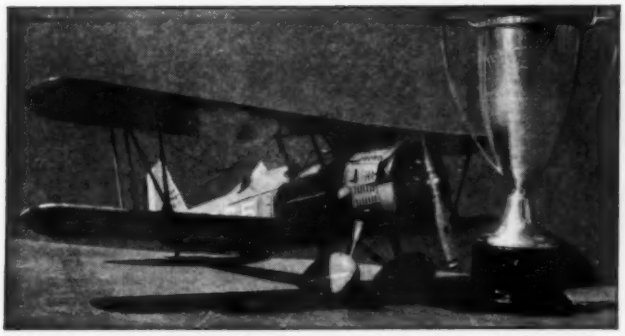
Pict. No. 6. An excellent fuselage contest model by Clayton Martin



(May) Pict. No. 7. A Martin Bomber uncovered and a Gee Bee built to ½ in. scale by M. G. Tucker



Pict. No. 1. Scale models of all the Thompson Trophy winners, by Bill Metzger and a friend



Pict. No. 2. A super detail scale model Vought V-65 and the trophy it won for Ralph Guernsey



Pict. No. 3. A model Ryan S-T of metal in detail by Ken Lee and Jack Weyer. Its big brother stands over it

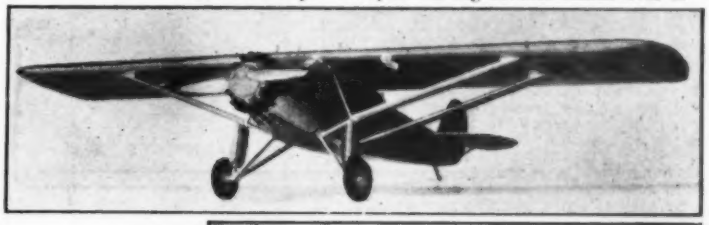
radio mast, flying wires, gun sight, celluloid faced instruments and other details. It is built to 5/8" scale and has a span of 19¾". Its weight is two ounces.

Clayton Martin of 22 Rockland Street, Swampscott, Mass., is not only a fine model builder but he appears to understand the art of photography as well. Picture No. 6 shows his fuselage job which he has snapped in such a position that the internal structure is clearly shown. He tells us that it is a three foot model and has made flights of over a mile. He says that this ship has a high aspect ratio and flies better on windy days than one with a lower aspect ratio, with which he has been experimenting. He is anxious to have other model builders write to him.

Picture No. 7 shows an interesting combination of models. One is the uncovered frame work of a Martin Bomber Y-10 and the other is a GeeBee Super Sporster. They are both made to ½" scale. The Martin has a retractable landing gear, movable, cockpit-operated controls. The Martin is an exceptionally fine piece of construction work. These models were build by Marion G. Tucker of 714 South Hayne Street, Monroe, North Carolina.

In picture No. 8 we have another fine piece of frame construction. It is an uncovered flying scale model of the 1935 Lambert Monocoupe D-145 which was built to a 5/8" scale. The motor especially is a work of art, containing 176 pieces. Other detail is carried out and in spite of this it is a remarkable flier. Ray Ohl is the creator of this fine piece of work.

Henry Clark of 46 Fort Washington Avenue, New York City, N.Y., has built some very excellent ships which are all very realistic. Picture No. 9 shows an eight inch solid scale of the "Spirit of St. Louis." The motor is built up of smal pieces of wood.



(May) Pict. No. 9. This model of the Spirit of St. Louis, by Henry Clark, has a span of only 8 inches

MODEL NEWS FROM OTHER COUNTRIES

Australia

Picture No. 10 shows the Australian Wakefield Team of the Maryborough, Queensland, branch of the Model Flying Club of Australia. Left to right, they are: C. Murdock, F. Therkelien, V. Buch. D. Wright is in front. Though the Australian fans have been bitten hard by the gas model bug they have not neglected the art of building rubber powered ships. This information has been sent to us by Mr. Ivor Freshman of 67 Liverpool Street, Sydney, Australia, who is the Club secretary.

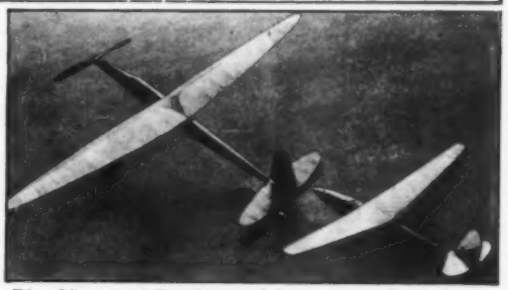
Russia

An interesting bit of model work comes from Russia. Picture No. 11 shows a power plane which tows a glider attached to the rear of it. This model air train works very successfully and has flown over 1000 feet. We are indebted for this picture to Mr. Kasan.

Norway

It is not often that we hear from Norway. However, Mr. Rolf Rasmussen of "Granholt," Nygard, Laksevag, Bergen, Norway, has sent us picture No. 12, which shows him launching a model on the ice of a lake during a contest near Bergen. It appears that the fever for

(Continued on page 56)



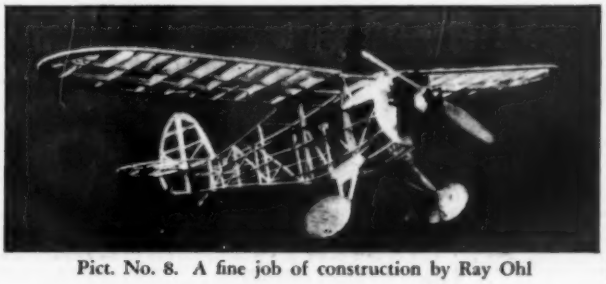
Pict. No. 11. A Russian model air train. The powered model tows the glider 800 ft. (By Kasan)



Pict. No. 10. The Australian 1936 Wakefield team. Left to right they are: C. Murdock, F. Therkelien, V. Buch. D Wright is in front. Some good looking models too!



Pict. No. 12. Rolf Rasmussen in Norway launches his model at a contest

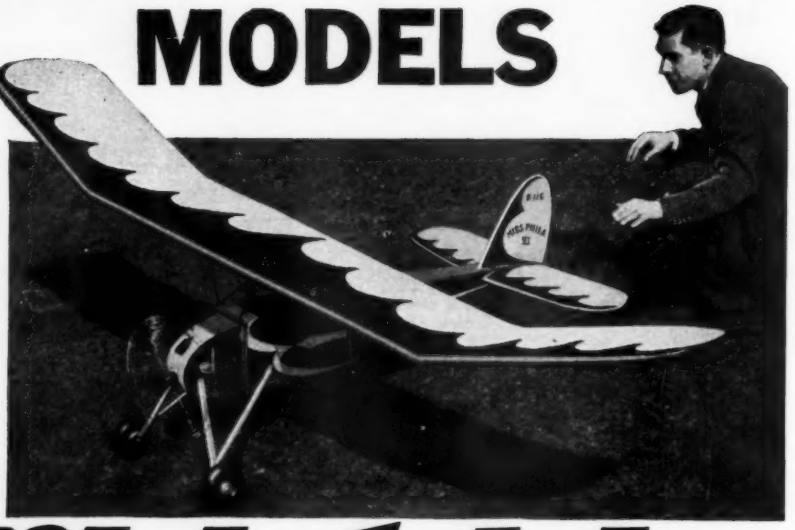


Pict. No. 8. A fine job of construction by Ray Ohl

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MAXWELL BASSETT'S
Prize Winning 8 ft. Gas Model

Miss Philadelphia

8 ft. WING SPAN. 57 in. LONG. WEIGHT (Less Motor) 3½ lbs. Flies One Hour on One Ounce of Gas
Gliding Angle: App. 25 to 1 Climb: App. 300 ft. per Min.

With Crash Proof Landing Gear, Flexible Wing Supports, High Wing Stability, Beautiful Blue and Yellow Coloring, and can be Powered with Brown Jr., Baby Cyclone "D", Ohlsson or any other Standard Gas Engine—a Sensational, Prize Winning Model!

FULL SIZE BUILDING PLANS with PHOTOS and DIAGRAMS that make Construction Quick and Easy.



1937 CHAMPION OF FRANCE
Time: 1 hr. 20 min.

KIT IS 100% COMPLETE INCLUDING

Ready Shaped Leading and Trailing Edges for Wing with Notches Ready Cut for Ribs
Special Design, Fully Finished 14 in. Propeller
Pneumatic Rubber Landing Wheels
Ready Made Balsa Ribs with Notches Cut for Spars

Also Complete Printed Balsa Bulkheads, Rudder Sections, etc., all accurate size strip wood, bamboo covering paper, Special gas model cement, streamlined tail wheel, aluminum motor mount adjustable for any motor, aluminum hatch for motor, complete hardware; knife switch, jacks, battery plugs, nuts, bolts, screws, tough landing gear wire, battery wire, spruce for reinforcing, complete insignia printed in colors on gummed paper and three extra large detailed PLANS giving every bit of information needed for building, also photos, diagrams and instructions covering both building and flying. The most complete and perfect construction kit ever put out! Ask your dealer to let you look at this BIG VALUE Kit, or send your order direct; Satisfaction Absolutely Guaranteed.

$9.95 Postpaid Less Motor

SEE NEXT PAGE FOR GAS MODEL MOTORS FOR THESE FINE MODELS.

RED ZEPHYR
America's Finest Popular Priced Gas Model

EASY to BUILD—GUARANTEED FLYER

WING SPAN: 6 ft. LENGTH: 56 in.
WEIGHT (Less Motor) 2½ lbs.

Complete Kit including 3½ in. Pneumatic Rubber Wheels. Completely Printed Wood, selected strip balsa, liberal quantities of everything, bamboo coloring paper and colored tissue for decorating, finished hardwood propeller, SCIENTIFIC'S exclusive landing gear brackets, nuts, bolts, wire, electrical connections, streamline tail wheel, large can gas model cement, all required insignia, two large PLANS showing and explaining every detail so even beginners can build the model quickly and successfully. Ask your dealer to show you this remarkable construction kit, or send your order direct; satisfaction guaranteed. Complete Kit only.....

$6.95 Postpaid Less Motor



MISS AMERICA 7 ft.

Winner of Grand 1st Prize at Metropolitan Gas Model Meet at Hadley Airport, and a reliable, consistent performer in the air at every model gathering. Designed by Frank Ziac, well-known model designer. Kit is complete with every item required, including 3½ in. PNEUMATIC RUBBER WHEELS, FINISHED HARDWOOD GAS MODEL PROPELLOR and FULL SIZE PLANS. If you want a reliable flyer for general sport anywhere, ask your dealer to show you this model, or send direct for it; Satisfaction Guaranteed.

$9.50 Postpaid Less Motor



TO THE SCIENTIFIC MODEL THAT WINS IN THE NATIONALS

We will award $50 Cash to the SCIENTIFIC Gas Model that takes first place in the 1937 National Meet on June 30, July 1, 2, and 3, in either the Open or Texaco Events. If Scientific Models win in both events, this award will be divided. Anybody can compete. The Models shown above are all potential winners. Build your favorite, enter the contest and if you win, the Award is yours—no strings or red tape.

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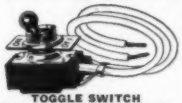
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TOGGLE SWITCH
Superior type for gas models; will not stick.
Each 39c

EXTRA! EXTRA!
Special Offering fine quality GAS PROPELLERS. True pitch, accurately carved with hole drilled.



Made of Clear Hardwood, natural finish. Sizes, 13 and 14 in. Price..... **99c** Each



KNIFE SWITCHES
2 Pole. Each 25c
3 Pole. Each 35c

A. C. Spark Plugs
For quick starting, more responsive pick-up, install one of these new plugs. Priced low. Each 75c

Brown Jr. Spark Plugs
Long known as the "miracle plug" for starting baby motors. Formerly $1.50. Now only $1.00

NEEDLE VALVES
Hardened Steel, for Baby Cyclone Motor. Guaranteed. Each..... 50c

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Easily taken apart for cleaning; leak-proof.
Each $1.00

Valvoline Motor Oil
Don't take chances with inferior oil. Per bottle with instructions....20c

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Strong and light weight. 36" wide, per Yard 50c
Extra Heavy Silk—Heavier than above and twice as strong. 36" Wide, per yard 79c

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Finest quality. 24"x36" sheet.
Each 7c
3 sheets for....20c

SPRING WIRE
In Straight Lengths.
1/16" diam. 3 ft. long. Each.....10c
3/32" diam. 5 ft. long. Each.....15c
1/8" diam. 5 ft. long. Each.....25c

ALUMINUM TUBING

1/8" O. D. per ft.	10c
3/16" O. D. per ft.	10c
1/4" O. D. per ft.	15c
3/8" O. D. per ft.	15c

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1/8"x1/8", per ft. 15c
3/4"x3/4", per ft. 25c

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Well seasoned wood, especially selected, straight grained and free from defects.
When you build a gas model you want the best, therefore, do not take chances with balsa of questionable quality. When ordering specify light, medium or rock balsa and we will select it as far as possible.

STRIP BALSA 5 ft. Lengths	Each	SHEET BALSA 5 ft. Lengths	Each
1/8x1/8	2c	1/32x2	10c
1/8x1/4	4c	1/32x3	15c
1/8x3/8	6c	1/16x2	12c
1/8x1/2	6c	1/16x3	18c
3/16x3/16	4c	1/8x2	15c
3/16x1/2	8c	1/8x3	20c
1/4x1/4	6c	3/16x2	18c
1/4x3/8	8c	3/16x3	25c
1/4x1/2	10c	1/4x2	20c
3/8x3/8	10c	1/8x3	25c
1/2x1/2	12c	1/4x2	25c
1/2x3/4	15c	1/8x3	35c

WRENCHES
Four wrenches, 8 sizes to fit any nut or bolt on any gas motor. Per Set 25c

FIRE-CRACKER COIL
If your motor is sluggish use this coil and get new pep and power. Good with all motors.
Each $2.50

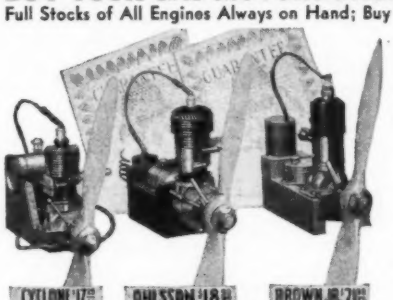
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Used on many winning models.
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The finish on a gas model does a great deal in making a successful model. Don't take chances with inferior low-priced finishes.

Clear Nitrate Dope, Colored Nitrate Dope, Nitrate Thinner, Gas Model Cement, Regular Cement, Bamboo Paper Cement, Banana Oil.
3 oz. bottle..$.25
½ pint can .80
1 pint can.... .75

Gas Funnel
With filter guarantees clean gas in motor. Each 30c

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Full Stocks of All Engines Always on Hand; Buy from SCIENTIFIC and Get a Double Guarantee



Propeller Free with Every Motor!

Announcing the NEW 1937 BROWN JR. GAS MOTOR
This has always been, and still is, America's finest gas engine. This new 1937 model has many improvements including a new type gas tank which can easily be taken apart for cleaning, and has a spring cap on the filler tube. Entire unit now lighter in weight. For the greatest efficiency and least trouble with a miniature gas engine wise buyers are selecting the NEW BROWN JR. ENGINE.
Price, postpaid, **$21.50**

NEW OHLSSON MOTOR
A real gas engine in every sense of the word. Power, Performance, Dependability, and Economy all combined.
Special Price, postpaid, **$18.50**

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Newly engineered to deliver more horse power and equipped with the new spark advance-retard control lever. A bargain Buy at its Low Price.
Each, postpaid **$17.25**

HARDWOOD PROPELLER FREE WITH EACH MOTOR
Included Free with each Motor is a special hardwood Propeller designed for the Motor you select—Also a booklet with full instructions for its operation and maintenance.



SCIENTIFIC PNEUMATIC RUBBER WHEELS
3½ in. Size for Models 3 to 8 ft. Black Rubber, aluminum colored hubs. Per Pair....$1.50

GAS TANK CAPS
Fits any engine. With air vent. Each..... 10c

PROP SHAFT NUT
Fits all engines. Each 5c

MODEL BUILDERS KNIFE
with exchangeable blade. Each 10c
Extra Blades—3 for 10c

LANDING GEAR BRACKETS
Simplest made; insert wire in holes at top and tighten set screws. Complete Set, per Pair 50c

Feather-weight Landing Gear Brackets
Complete set of 4 clamps with 4 screws and nuts to attach to wire. Priced low. Per set 25c

Doughnut Rubber Wheels
Just right for tail wheels on gas models.
1" diam. Each 8c
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Condenser
Light weight for all gas motors.
Each 20c

TURNBUCKLES
Finest thing for tightening guy wires.
½" Long. Each.....20c
4 for 75c
1" Long. Each.....25c
4 for 90c

JACK and PLUG
The most practical idea for attaching booster batteries for extra power when starting motor.
Jacks, each.....10c
Plugs, each.....10c

MOISTURE-PROOF HOOK UP WIRE
The answer to wiring troubles—absolutely oil, gas and water proof.
Coil of 5 ft. 20c

AXLES
Threaded, with 4 Nuts.
24" Long.....35c
20" Long.....30c

M & M RUBBER WHEELS
1¼", 1⅝", 1½", 1⅝", —per Pair 30c
1¾", 1⅞", 2", 2⅛", 2¼", 2⅜", 2½", 2⅝" — per Pair.....60c
3¼", per Pair $1.50
3½", per Pair 3.50
4½", per Pair 3.75
6", per pair.. 4.50

AIR SPRAY GUNS
Fine for applying finishes to all models.
No. 1 Size....89c
No. 2 Size, shown above, each..... $1.19

ACCURATE FLIGHT TIMER
A necessity for the 45 seconds National Finals. Small size, weight 2¼ oz. Adjustment, 0 to 120 seconds. Silver contact point, switch easily mounted in any position on gas model. Each.....$3.00

Brass Tubing
1/8" O. D. per foot....10c
3/16" O. D. per foot 15c
¼" O. D. per foot .20c
5/16" O. D. per foot 20c

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Get in on this new business of gas model Kits and Supplies. Order the Complete SCIENTIFIC line at your regular discount or, if you are not already a SCIENTIFIC dealer, write today on your letterhead and get full details.

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NEW 1937 CATALOG Illustrating and Listing at Lowest Prices Thousands of items for Gas Models, Boats and Rubber Models. Limited Edition. Send for yours now..... **10c**

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Add 15c to orders up to $1.50. On orders over $1.50, 10% of order. Orders amounting to $4.00 and over are sent postpaid. All SCIENTIFIC Kits and Gas Motors are sent postpaid. All orders shipped same day they are received

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N.A.A. Junior News

(Continued from page 21)

at a Philadelphia Model Aeroplane Association meet. Then on March 27 along came George Micott, of Allentown, Pa., with a record flight of 8 minutes, 5.4 seconds for seniors with a Class A stick model, R.O.W. The former record in this class was 7 minutes, 41.1 seconds.

Prize Winning Specialist

Exhibition models in minute detail that have bagged him an enviable collection of trophies are the specialty of Robert Kirch of Corona, N.Y.

Kirch, who has been building models since 1929 and who has devoted his interest to exhibition types since 1933, is shown on this page with his scale model of a Boeing F4B-4 which has won a first and second prize in contests of this class. It required over 300 hours to build and contains more than 1,100 individual pieces of material.

Develops Control Device

E. L. Hughes, Kansas City, Mo., contest director, has developed the device shown in the accompanying picture which controls the flight of a gasoline-powered model after it has been launched.

A light-weight inexpensive watch, with crystal and crystal case removed, is installed in an accessible position in the fuselage and a movable, pivoted lever arm is placed adjacent to the watch so that the long end of the lever makes contact with the pointed end of the minute hand. As the minute hand travels around the dial in one position it makes contact with the lever arm. The short end of the lever serves as a catch releasing a small flat spring whenever the lever moves. The spring is connected with the electrical circuit to the motor and breaks the circuit when in the open position.

How to use the device? Quite simple, says Hughes. Merely set the minute hand ahead of the lever for any desired duration of from 30 seconds to an hour. When the time interval elapses, the minute hand comes in contact with the lever which breaks the circuit. Heretofore, the duration of such flights, barring mechanical trouble, has depended entirely upon the amount of fuel carried.

U.S. to Join England in Intercollegiate Meet

Signaling what is expected to be an annual event among the principal nations of the world, an international intercollegiate air meet between the United States and England is scheduled to be held near London the second week in July. Members of the National Intercollegiate Flying Club will compete with pilots from Cambridge, Oxford, and the University of London in a two-day contest at Heston Airport.

The events to be held have not yet been definitely decided upon but so keen are the Britishers on cross-country flying that it is understood a race of considerable distance will be one of the more stimulating features.

Later it is planned to hold an international intercollegiate meet in this coun-

PEERLESS TAYLOR CUB



Rubber Powered

53" FLYING WONDER

Designed to 1½" scale—Length 33¼". An easy to build, rugged model that will give thrill after thrill with its wonderful flights. Complete Kit (nothing else to buy) for this amazing price—contains all wood, cements, colored tissue, drilled nose block, finished turned balsa wheels. Add 10c for postage and packing. $1.00

Send 5c in stamps for latest catalog No. 7

The Peerless Model Airplane Co.,
3088S W. 106th St., Cleveland, Ohio

Enclosed find $1.10 for one Taylor Cub kit to be sent to

Name .....

Address .....

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FREE! SPECIAL OFFER!!! On orders of $1.00 or more. Your choice of No. 1 or No. 2.

No. 1—1 Radial Motor (any size listed) 5 sheets of 1/32x2x18 Balsa 50' of 3/32 or ⅛ Flat Rubber

No. 2—1-2 oz. Bottle of dope 6—Sheets of White JAP TISSUE 50' of 3/32 OR ⅛ Flat Rubber

For 36" Stock, double 18" prices.

18" Balsa Strips
1/16x1/16 .20 for .05
1/16x1/8...16 for .05
1/16x1/4...14 for .05
3/32x3/32..12 for .05
1/8x1/8....11 for .05
1/8x1/4.....7 for .05
3/16x3/16..6 for .05
1/4x1/4.....3 for .05
1/4x3/8.....2 for .05
1/4x1/2.....2 for .05
1/2x1/2.....2 for .05

18" Sheet Balsa
1/32x2 ....6 for .10
1/16x2 ....6 for .12
3/32x2 ....3 for .05
1/8x2 .....2 for .05
3/16x2 ....3 for .07
1/4x2 .....3 for .14
1/2x2 .....2 for .11

Prop Blocks
1/2x3/4x5 ..5 for .05
1/2x3/4x6 ..4 for .05
5/8x1x7 ....3 for .07
3/4x1x8 ....2 for .05
¾x1¼x10 ...2 for .09
¾x1¾x12 ...2 for .12
1x1¼x12 ....1 for .08
1x1½x18 ....1 for .09

18" Balsa Planks
1x1 ..... .09
1x2 ..... .15

Cement
1 Oz. ..... .08
2 Oz. ..... .15

Dope
1 Oz. ..... .08
2 Oz. ..... .15

Thinner
1 Oz. ..... .05
2 Oz. ..... .09

Tissue
White....3 for .05
Colored....3 for .10

Rubber
3/32 flat 18"...for .02
⅛ flat 20"....for .05
3/16 flat 15"...for .07

Bamboo
Shredded 12 for .01
1/16x1/4x18..... .01

Bushings
4 for..... .01

Wheels (Per Pr.)
Birch, Balsa, Cellu.
½" .01 .03
¾" .02 .03 .05
1" .03 .04 .07
1¼" .04 .06 .09
1½" .07 .11 .15

Wire
.014, .020, .028, .034
6 feet for..... .03

Thrust Bearings
Large or Small... .01

Washers
¼" Brass...doz. .01
¼" Copper..doz. .01

Dummy Celluloid Radial Engines
1½" ..... .10
2" ..... .15
2½" ..... .18
3" ..... .23

Reed
1/32, 1/16, 1/8, 5" for..... .02

ORDERING INST.
Please remit by Postal Money Order. No Stamps. No orders under 50c; on orders less than $2.00 add 10% for packing and postage. Over $2.00 sent prepaid. On foreign orders add 15%. NO C.O.D.

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try with representatives from many of the major foreign countries taking part.

The N.I.F.C. has decided to sanction a trophy for international meets to perpetuate the memory of William Yamamoto, killed in an accident abroad last summer, who as an undergraduate flyer at Kenyon College was active in the international plans of the organization.

Undergraduate Pilots Compete in May Meets

Undergraduate pilots on Eastern campuses gathered at Wings Air Port, Philadelphia's Aviation Country Club, on May 1 for the first Eastern Intercollegiate Air Meet. The program included bomb dropping, paper strafing and spot landing contests. John B. Railsback, president of the University of Pennsylvania Flying Club, which was host to the visiting pilots during their week-end stay, managed the meet. Cups, medals and trophies were donated by Philadelphia clubs and officials.

The Kenyon College Flying Club has broadened a contemplated Ohio State Meet into a Mid-Western Meet. The event is scheduled to be held at Gambier, Ohio, seat of Kenyon College, on May 22. Invitations have been sent to leading clubs in the region.

At the contest between Kenyon, Purdue and Akron University, held at Akron on April 25, Kenyon rolled up 130 points, Akron amassed 90 points and Purdue, 50. The schedule included spot landings, bomb dropping and a 12-mile handicap race.

Francis J. Tlush Named On Model Meet Committee

The NAA Contest Board has announced appointment of Francis J. Tlush, one of the best-known model builders in this country, as a member of the National Model Meet Committee, which will give advice and make suggestions concerning the 1937 Nationals. Tlush, who lives at Lyndhurst, N.J., won the Texaco Trophy in 1936 with a gas model, which was entirely of his own design and construction, including the engine. His plane is now prominently displayed in the Times Square district in New York.

NAA Junior Chapter News

Ralph H. Lewis has announced formation of the Chanute Junior NAA Chapter, of Peoria, Ill., with the following officers: Howard Thompson, President; Francis Thornburg, Secretary; Jack Larson, Vice President. The Chapter was named for Octave Chanute, who is buried at Peoria.

George H. Crose, Contest Director of the Denver Mile Hi Aero Club, writes that a meet is planned for April 18th.

Russell A. Perry, Director of Recreation, City of Aurora, Illinois, writes: "500 people witnessed our first indoor contest held here on March 21. There is a possibility that Mr. Ted Stoner, of the Stoner Manufacturing Company, will fly our boys from Aurora to compete in the National Contest. Mr. Stoner is one of our leading enthusiasts among Aurora merchants and is offering a gas model plane to the winner of an extensive summer point program."

The Exchange Club of Sidney, New York, reports that it is sponsoring a model airplane club at the local high school.

Robert McNemar, of the West Virginia Model Aircraft Shop, is heading an organization committee to form a Junior NAA Chapter in Huntington, W. Va.

M. L. Terry, of the Waterloo, Iowa, Senior Chapter, writes, "We have about 250 boys now who are interested in model aircraft construction."

The Hazleton, Pa., Senior NAA Chapter has announced that it will sponsor the local junior group.

LeRoy A. Johnson, Secretary of the Minneapolis NAA Chapter, writes that he is making plans for the organization of a junior division.

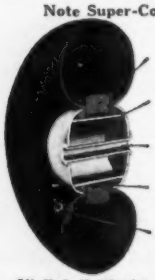
Chicago and Boston Vie for New Records

The battle of the helicopters and ornithopters has been going on at a furious pace in recent months. Boston apparently started it all when Paul Durup, at a Jordan Marsh Junior Aviation League indoor contest on November 7, established a senior class helicopter world record of 1 minute, 4 seconds. This apparently was all that was needed to get Chicago going, for on December 12, at a Chicago Aeronauts meet, Dean Decker broke Durup's record with a time of 1 minute, 49.8 seconds. At this same meet Alex Nekimken established the excellent time of 2 minutes, 7 seconds, to set a new junior class helicopter world mark. Carl Goldberg also added to the world record listing by establishing an open class helicopter mark of 2 minutes, 46.2 seconds, which still stands as tops in the helicopter list.

While Chicago was going after the Boston helicopter records, Boston apparently was laying plans for new records in the ornithopter class, for on January 2, again at a Jordan Marsh Junior Aviation League indoor meet, Ralph Brown set a junior class ornithopter world mark of 7.6 seconds, while Edmund Whittier set a senior class record of 7.2 seconds. Again thus stimulated, the Chicago Aeronauts came back with a bang on January 30 with three performances in the senior class bettering Whittier's record, namely, John Kublis, with a time of 1 minute, 17 seconds; Edmund Swort, 2 minutes, 4.6 seconds, and Dennis Turner, with the present record

Insure Your Models with M & M's WHEELS

Note Super-Construction of M & M 3½—4½ and 6" Wheels



All M & M Wheels Patd and Pat. Pend.

5 Reasons Why These Wheels Are Popular the World Over

Special Designed Hub giving added protection on heavy landings.

Aluminum Spreader giving added strength and cutting weight to minimum.

9/16" Axle Housing—note heavy roll on tube ends—also large bearing surface.

Addition Air-Cushion found only on M & M Super Gas Wheels.

M & M Sure Seal Valve—why they are easy to inflate and deflate.

ALL M & M's WHEELS CAN BE INFLATED and DEFLATED



M & M Super Heavy Duty Wheel for Rubber Powered Models

SIZES 1¼—1⅜—1½—1⅝"—PRICE $0.50 Per Pair, Postpaid. SIZES 1⅞—2—2⅛—2¼—2⅜—2½—2⅝"—and Special Designed Do-Nut Wheels. Size 3½"—PRICE $0.60 PER PAIR, POSTPAID. For Air Mail Add 11c.

M & M's FOR LARGER GAS MODELS
Size 6"x1⅞". Price $4.50 per pair P.P.
Size 4½"x1⅝". Price $3.75 per pair P.P.
Size 3½"x1⅜". Price $3.50 per pair P.P.

M & M 3¼" GAS WHEELS with improved M & M axle housing for 9/64th or No. 28 drill rod axle. Designed for Light Weight Gas Models. Weight approximately 2½ oz. per pair. $1.50 Per Pair, Post Paid. For Air Mail Add 21c

Why not protect your model and eliminate complicated landing gear? Buy a pair of M & M's.

If located in Washington add State Tax

Obtain M&M's from your dealer or send to us. Dealers: Our New Discounts Are Very Attractive.

M & M MODEL WHEEL CO.
325 North 79th Street Dept. M-7, Seattle, Wash.

time of 2 minutes, 21.6 seconds. Milton Huguelet, Jr., moved up Brown's junior class record to a new time of 1 minute, 36.8 seconds, while Carl Goldberg came through with a new open class ornithopter world mark of 1 minute, 28 seconds.

While this is being written, we are wondering if the J. M. Junior Aviation League has been sufficiently incensed by such Aeronaut flaunting of its record times to be making plans to dim the Aeronaut's glory in the autogiro classes. In a meet held January 2, the Aeronauts established the following autogiro world records: Carl Goldberg, open class H.L. autogiro—54 seconds; Milton Huguelet, junior—1 minute, 11 seconds; Richard Obarski, senior—2 minutes, 26.5 seconds.

All of the above ornithopter, helicopter and autogiro marks were, of course, indoor records and were made during the regularly scheduled indoor winter season meets of these two alert model organizations. Other records which have been racked up during the winter season include: Class G fuselage R.O.W. junior indoor record of 4 minutes, 57.6 seconds, established by Joseph LaHuta, of Camden, N.J., during the regular Philadelphia Model Aeroplane Association meet held on January 25. Akron, Ohio, added to its model fame on October 3 when at the Junior NAA meet directed by H. M. Jellison, Bernarr Anderson established a new gas model world performance, senior class, of 81 minutes, 3 seconds, with a model weighing 6½ pounds. At this same meet, R. H. Bodle set an outdoor fuselage, open age class record, with a 145 sq. in. wing area model, of 61 minutes, 31 seconds.

SPECIAL NOTICE

The maximum weight limit for radio controlled gas engine powered models has been raised from the former limit of 12 lbs. to 25 lbs. This new ruling is to be effective after June 1st, 1937.

So You Want to Break a Record

(Continued from page 5)

you have almost swallowed your tongue for fear you were going through the fence at the far end of the field!

You practice with careful and cautious approaches and finally manage to acquire a degree of skill which enables you to land shakily with a fair amount of precision. That's fine, when you have a large and smooth field, but how about a forced landing? Well, that's where a particular type of mental equipment comes to the fore and you'd better strive to attain it, if you want happy landings.

The successful speed aviator should possess the ability to recognize certain hazards with equanimity. But, to this quality should be added some of the spice and eagerness which goes into the make-up of the ten-goal polo player. This type of pilot knows that he won't have a forced landing, but if he does, something will make it possible for him to get away with it.

Howard Hughes was setting his speed record in California recently when his





WHITFIELD'S
JAPANESE TISSUE
Brilliant
THIN AND STRONG
AA In 32 Colors AA

Reference from Oklahoma:
"OUR RECENT ORDER FOR AIRPLANE TISSUE RECEIVED IN FINE SHAPE. WE ARE PLEASED WITH THE QUALITY AND ARE SURE THE BOYS WILL ENJOY WORKING IT UP. PLEASE SEND THE FOLLOWING ORDER."

BAM-BOO TISSUE

JAP-FIBRE paper superior to silk for GASOLINE POWERED MODELS. Weight and strength properly proportioned. Natural shade. Handmade.

Recommended by all leading firms and also by builders of record-breaking gas models.

JAP PROPS



STANDARD TYPE



BROAD BLADE
50% More Efficient



STEEL TYPE



BRASS PROPELLER SHAFTS



MINIATURE CELLULOID MOTORS
4 sizes: 1½"; 2"; 2½"; 3"
Another Japanese Import

These lightweight motors have been designed to our specifications. Every detail of the original radial engine has been accurately reproduced even to the cowl plate at the front. They are a distinct improvement over any other dummy motor. At Whitfield's low price, they can be easily included in every flying model kit.

We Pay Shipping Charges

WHITFIELD PAPER WORKS
Note New Address:
76 VARICK ST. NEW YORK CITY
Established 1869

engine quit cold. He had practically no altitude and the wheels of his racer were tucked up into the fuselage. There was nothing to do but land straight ahead in a beet field. This he proceeded to do with highly satisfactory results. But if he had worried beforehand about the possibilities involved, likely he'd never have taken off.

Your firiends will tell you that you should reduce the landing speed of your plane. You may as well point out several facts to them right now. One being that for nearly three decades man has been trying to increase the top speed of planes without boosting the landing speed. It happens that there is a very definite ratio between the maximum and the landing speeds. This speed ratio generally lies between 3 and 4. That is, the top will seldom be more than 4 times the landing speed.

Therefore, to attain a high maximum, you must arbitrarily accept a fast landing speed. For example, the plane which will top at 240 miles per hour will land at over 60. There is only one exception to this—and that is the case of the airplane salesman. He will give you a slow landing speed along with an unusually high top. But, if you will add 10 miles to the alleged landing speed and will subtract 20 from the promised top, you will be pretty close to the actual performance.

Devices such as flaps and variable camber have been introduced to enable a pilot to land his craft at a reasonably safe speed. One of the most novel ideas developed were wings constructed in such a manner that the tips could be retracted. Thus, the wingspan could be reduced in flight. This removed resistance and increased the cruising and top speed. Results along this line have varied. Suffice to say, this remains one of the biggest problems of the modern aircraft designer and largely accounts for the persistance of the auto-gyro in the aviation market of today.

At last you feel as though you can handle your speedy craft. The problem of navigation now becomes foremost in your thoughts. Obviously, on a flight such as you propose, it is essential that you be exactly on your course at all times. Every mile of aimless wandering eats up the minutes and offers less chance for setting a record. Nor can you afford to fly your route over noraml airways, because they were established with terrain as a primary consideration. Detailed thought of the type of country under you is not possible to a record seeker.

The shortest distance between two points remains, as always, a straight line. But, be careful of the chart you use. The ideal person to plot your course would be the map designer of any railroad company for it is not beyond their ability to take the most crooked railroad in the country and straighten it out with one sweep of a drawing pen. And, if you take your course from a Mercator projection it will be misleading, thanks to its efforts to portray a flattened globe. On this projection, a line drawn from Burbank to New York will approximate the cities of Albuquerque, Wichita, and St. Louis.

The great circle course, only, is the shortest distance between two points on the surface of the earth. This is a straight line when projected down upon a sphere and is best demonstrated if you will stretch a string taut on a globe between Los Angeles and Gotham. You will note that, roughly, this line passes close to Denver, Omaha, and Cleveland. This, then, is your shortest route and the only short cut to fame open to the record-seeker.

Due to some of the higher machinations of the map makers, the great circle course is one of constantly changing headings. That is to say, if plotted on a Mercator projection it will appear as a huge curve. For all practical purposes it becomes feasible to plot a straight line between each of the key points along the great circle route and you should fly directly over every city covered by this pencil line.

The over waters fliers generally have their own courses plotted long before they take off and may change their headings as often as every two hours. The wind becomes the only variable and most of these pilots have the velocity and direction of the average wind worked up into their advance calculations. Then, all they need to do besides the actual mechanical flying, is to steer given courses at certain hours.

Skilled pilots of the Lindbergh and the late Kingsford-Smith school, actually calculate their position in the air by means of celestial observation. They are independent of variables and fly to their destination in a seaman-like manner. Others fly from continent to continent. If they arrive anywhere close to their destination, it is little more than coincidence.

Fortunately for your record flight, the Department of Commerce, the Army, and the Navy have prepared detailed charts for airmen covering most of the United States. Known as strip and section maps, they will give you casual information such as the location of a roundhouse with respect to a city, a factory chimney, or a spring of water in an isolated territory. Important highways, railroads, and prominent landmarks will all be in their ploper places.

Your charts will cost you only a few cents each, but there are other navigational aids which will assist greatly in saving precious minutes. A fairish compass can be had for a couple of hundred dollars. Of course, if you want the best —! At any rate, you'd better know how to use it properly. It becomes an aggravating instrument when it begins to spin around like a dervish and you find it almost impossible to hold your speedster on the course. Better make a few five hundred mile flights with it just to make sure you have a thorough understanding of this instrument.

It goes without saying that you must have the compass accurately calibrated to remove any local magnetic influence which might be caused by the plane's structure. After that, you'd be wise to take some lessons from a tutor regard-



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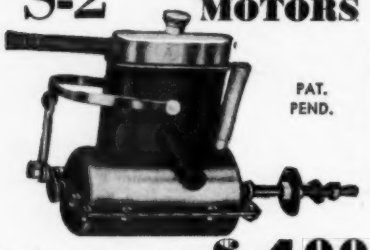
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ing the application of variation and deviation to the true course as shown on your chart, in order that you can fly the corrected compass course. Better men than you have been sadly lost by inadvertently applying the correction on the wrong side.

Then, too, you should make a note on your charts that the variation constantly changes as you travel eastward across the United States—the maximum difference being about 15 degrees. Overlooking this unpleasant complexity may land you in Ottawa.

If you really want a helpful gadget you must have a radio set capable of tuning in on the regular Department of Commerce weather broadcasts. You never know when you will need such in formation badly and the small extra weight will more than compensate for itself. Besides, should you get lost over "the top," it might be necessary to use the radio beams to locate yourself.

To supplement the small receiver, a radio loop will prove invaluable. With this device you will be enabled to take off from Burbank with your set already tuned in on any Denver broadcasting station. Either you can home or fly directly to the station by listening to the program, or you may watch a dial on your instrument board which will indicate when you are on-course or on which side of it you may be. When you arrive over Denver you simply retune to an Omaha station and subsequently, Cleveland and New York.

A young German-American scientist, Gerhardt Fisher, designed and installed such a set in Wiley Post's Winnie Mae for use on his remarkable solo world flight. During his experiments in stratospere flying, Post found his radio loop of tremendous value. Similar equipment has actually been hooked up with a gyro pilot, making it possible for a plane to be flown automatically to any desired broadcasting station.

It goes without saying that you must be fully equipped for instrument flying. The usual turn-and-bank indicator should be supplemented with the artificial horizon and the gyro director. Since you are out for a record you don't dare fly around bad weather. You must plough into the thick of it or else lose precious minutes.

For the most part you will fly well above the average soupy weather, but there are times when black, rolling clouds will reach up to 20,000 feet and enfold you in their wet, clammy vapor. Then, too, you may find it necessary to fly over-the-top for several hundred miles and in the event of a forced landing you must go down through. Or, your destination might be closed in when you are sure to be low on fuel and must go down.

If you're not too sure of your ability to fly by instrument when the horizon is blotted out in soup, perhaps you'd better take a detailed course in blind flying. The best one obtainable will only take about a month of your time and a check for six hundred dollars will cover all expenses.

If you have persisted on your speed campaign this long, you are nearly through the ordeal of preparation. But, there remains the long grind of fuel consumption tests. You must go aloft and while away the weary hours with your engine turning over at various and constant speeds. It is essential that you know the fuel consumption of your powerplant at different speeds and when carrying varying loads.

After you have filled page upon page with figures, you spend a week on the ground trying to analyze what you have done. Then, you draw up some curves, which will tell you which engine speeds at various times throughout your flight will give you the greatest speed most economically. Obviously, if you are going to try for a nonstop record you must make the most out of the restricted amount of gasoline you are able to carry. Otherwise, you might as well wire on ahead to various airports in order that they will have a goodly supply of quality fuel on hand when you fly in with an empty tank.

Last of all, run the plane into the hangar for a final wash down. Every speck of oil and grease must come off and on the smooth surfaces is spread wax. The polish is developed until you can almost see your reflected image. Obviously, this means decreased drag and increased speed.

At last, you have a toy as bright as the proverbial new dollar. The engine gets its final check and is tuned up to perfection. All gas strainers are cleaned. The gas tanks bulge. Your racer is ready to go.

As for you, you're tired and worn out. You've been under a terrific tension handling the craft which is scarcely more than a flying engine. You're exhausted and don't much care whether you get off or not. A little sleep and you feel better.

Nothing to wait on now but the weather. A desirable set-up would give tail-winds all the way across. As a matter of fact, the constructor should have built tail-winds in your plane. Normally, on the eastbound flight you may expect following winds, especially at high altitudes. You must take advantage of this, even if you find it necessary to suck on the pipestem of an oxygen tube all the way across.

It happens that the United States is so large that it is almost impossible to find good weather at all points. It then becomes a matter of judgement as to the locality in which you prefer to encounter foul weather. Perhaps you would rather leave the Coast under favorable conditions and take your chances with the soup in the Middle West or the East. Or, possibly you prefer to fight it out at the start and then coast in with good visibility and ceiling. Make up your

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mind. You can't have everything!

Oh, yes! One more item should be mentioned. Since you've spent so much money already on this project, you may as well spend another $350 and buy yourself a parachute. A cut gun over tough country and you may have to bail out to save your neck! These record-breaking flights do not have the surety of the regular airlines.

Yes, she certainly is a pretty little ship. With any luck at all you might break the record.

The Hawk "III-C" in Miniature

(Continued from page 11)

hinges are of ball bearing construction.

The Empennage

The front and rear beams of the fin are of steel tubular structure; the front beam of the stabilizer is of steel tubing, while the rear beam is of channel section of dural, and the torque tube of the elevator is of steel tubular structure. The ribs are riveted to the beams and are of dural channel section. They are provided with lightening holes of varying diameters. The outside edges are of dural sheets, which are riveted to the ribs. The leading edges of stabilizer are covered with dural; the entire empennage is covered with cotton, with the exception of the flettners, which are of metal.

The Chassis

Both sides of the landing gear are separate units. The welded steel drag trusses are of fixed length and are hinged to one at two fittings on the lower parts of the fuselage's side truss. On the other end, it is hinged to the shock absorber's strut by a horizontal pin joint. The axle is rigidly attached to the lower portion of the oleo strut. The retracting nut on the top of the oleo strut is internally threaded and mounted to pass through a retracting screw. Rotation of the retraction screws raises and lowers the oleo and drag struts; in and out of the wheel well. The upper ends of the two retracting screws are joined by bevel gears and are mounted with a sprocket. This sprocket is connected to the retracting crank in the cockpit by means of an endless chain.

The tail-wheel unit is of 360 degrees rotation and can be locked in fore, aft and straight position; and is controllable from the cockpit.

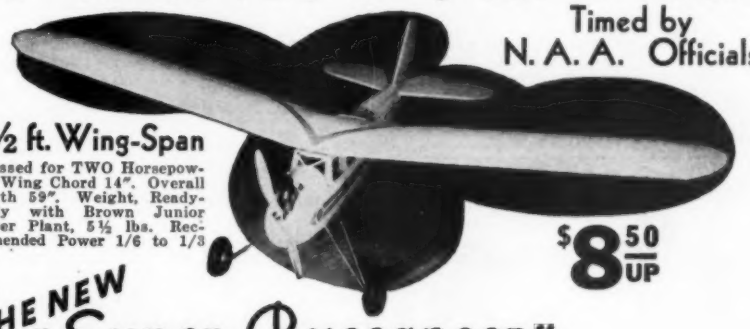
Making the Model of the "III-C"

If the model builder wishes to build a solid scale model from these plans, he may do so. First, choose the size you wish to build the model and enlarge the general three-view outline to that scale; omit all internal details. Draw the fuselage's cross sections and the rib's cross sections to the same scale as the rough drawings' scale is. With these rough drawings on the cross sections, make all necessary templates; either out of cardboard or metal. After the templates are made, refer to the rough drawings and determine the width, length and height of the fuselage. Secure a fine grained stock of wood that will be a half inch over these dimensions and square up all sides. Draw the center lines through all sides; secure its exact location by referring to the rough drawing. Trace or draw the fuselage's outline of the side, one left and one right. Cut away all surplus and when complete, square the recent cut side with the other sides. Now trace or draw the top and bottom fuselage's outline on their correct sides; and cut away all surplus. After all sides are found to be square, now begin to shape the cross sections. First use template made for section "C-C," locate this section on the block and shave away all surplus to the shape of the template. Locate section "B-B" on the block and shave from "C-C" to "B-B" into a smooth exact contour. After "B-B" is shaped, locate section "A-A" and work section "B-B" smoothly into "A-A"; without spoiling the fuselage contour. Reverse this procedure when shaping toward the tail post. After the entire fuselage is correctly shaped, make the engine cowl and attach to the fuselage. Carve out the wheel well, add all small gadgets and details and then add the wing butts for the lower wings.

Now proceed on the wings. After the height, width and length are known, obtain a fine grained block of wood that is a half inch over these dimensions; for clearness. On this block, lay out the general outline of the top sides of each separate wing panel. Now carefully cut away all surplus on both the leading edges and trailing edges of the panels; when completed, make sure that the newly cut sides are square to the other sides. Now lay out the dihedral angles of the bottom sides of the

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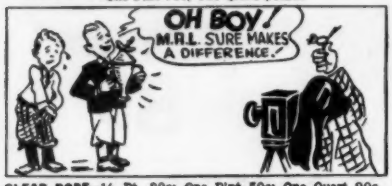
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1/16"—20 ft.	5c—225 ft. 30c	5/32"—15 ft.	10c—225 ft. 75c
5/64"—20 ft.	5c—225 ft. 35c	11/64"—15 ft.	10c—225 ft. 85c
3/32"—15 ft.	5c—225 ft. 45c	3/16"—15 ft.	10c—225 ft. 90c
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panels; on both the leading and trailing edges. Plane or shave away the surplus toward the tips. After the bottom is found square to the other sides, mark off the location of rib No. 22 on both the top and bottom sides of the top wing (refer to bottom view drawing on page 2 to find the location of this rib No. 22). Use a template of this rib's cross section to check the shaving and shaping of this section to its exact shape. When finished, mark off the location of rib No. 36 on both sides of the top and bottom, the upper wing and shape this section to fit the template of rib No. 36. When the spaces between rib No. 22 and rib No. 36 are smoothly shaped, finish up the tips by using the same method employed in shaping the fuselage. Do the same on the small ribs in the center of the upper wing. Use the same procedure used in shaping the upper wing to shape the two separate lower wings. Start off with using rib No. 16 and work this section into rib No. 6. The ailerons on the upper wing may be cut out and made into two separate hinged sections. On the top wing and lower wing mark off the location of all strut and wire attachments. Insert the fittings of your own design into their correct places, making sure that the attachments are secure and strong. Now add all extra wing details, such as thread for imitation ribs, the imitation turnbuckles and so on.

Now rig up a jig that will permit the attachment of the wings to the fuselage with the greatest accuracy. It is best to attach the cabane struts to the upper wing first; then connect the wing to the fuselage; add the "N" struts and attach the two lower panels separately. When the wings are strongly mounted, add the flying wires and separators. Now make up the entire tail section and attach to the tailpost in the same manner as the wings are attached. After all other details are worked out, you may make the chassis into a movable unit or make the wheel fixed in its wheel well or retracted position.

After all details are finished and the model is ready for the paint, shellac the entire model. Make the shellac thinner by adding alcohol; give the model several coats, sandpaper between coats to give the foundation a smooth surface. Now paint or spray the model with your chosen color; if you spray the model, the appearance is more apt to be better than a hand-painted finish.

Official color scheme of the export Hawks:

Country	Color of Airplane	Colors of Insigne
Argentina	All Silver	Sky Blue and Gold
Canton, China	All Cream	Red, White and Blue Tan and White Stripes on the Rudder
Shanghai, China	All Dark Khaki	Blue and White Cocade Blue and White Stripes on the Rudder
Siam	All Silver	Red, White and Blue

Explanations of the figures on the drawings:

Fig. 1—This shows the view of the cockpit looking backward from the instrument panel's vertical line. (All details of the controls are shown in Fig. 4.)

Fig. 2—This shows the left side of the fuselage with all its controls and partitions.

Fig. 3—This shows the right side of the fuselage with all its controls and partitions.

Fig. 4—This shows the view looking forward from the pilot's seat (the joystick is missing for clearness.)

Fig. 5—This is the top view of the floorboard, showing all its joints and removable panels.

Fig. 6—This is side view of the fuselage showing the entire control hook-ups, the pilot seat, the fuel tanks and the instrument boards.

Fig. 7—This is the right and left side view of the fuselage's skeleton.

Figs. 8 & 9—This is the bottom and top views of the fuselage's skeleton.

Fig. 10—This group shows all internal braces of the fuselage skeleton (the circles on the corners are the exact centers of the center-lines.)

How to Build a Cloud Cruising Gas Model

(Continued from page 35)

construction, outlined with aluminum tubing and cemented to the spars and ribs. This tubing is shaped by drawing it through the palms of the hands.

The elevator is held horizontally by a permanent pin centered in the spar and a dural fitting at the leading edge. The pin in the tail post, passing through a hole in the center of the brace, holds it laterally. See details and sketches.

The rudder is hinged to the fin and is adjustable by moving two nuts on the screw fittings. Cement and bind these fittings securely to posts.

The fin has two fittings, one at the front which hooks over the torque adjusting screw. The other is a "U" fitting which is located near the bottom of the post. This fitting is notched to fit over a bolt that passes through the tail post.

Tightening the nut on this bolt locks the entire tail assembly in a rigid position.

Wing

The wing is made in two sections. All the ribs, spars and edges are balsa. The tips are shaped aluminum tubing.

The center ribs are ¼" thick. Note the position of the pin mount holes. To prevent these holes from wearing, you should cement sheet aluminum or brass washers around them.

The wings are held in place by rubber bands and streamlined balsa "V" struts. The rear fittings on these struts are adjustable. To prevent moving, place a lock nut on each drag adjustment screw.

Covering

The covering material can be cotton (nainsook) or China silk. Paper is not recommended. Cotton, though a trifle heavier, will not snag as quickly as silk.

Use the same methods to attach the fabric as you would in tissue covering, but use clear acetate dope instead of banana oil.

Give the covering three coats of clear and two coats of colored dope.

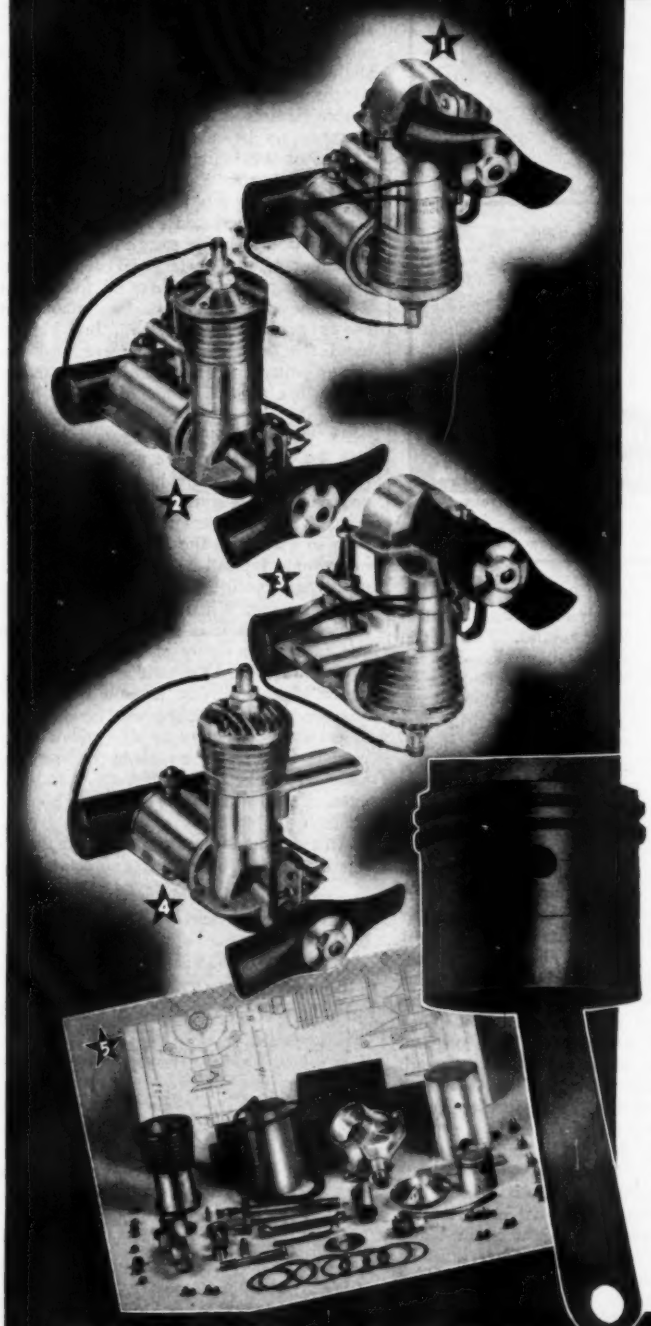
Choose your own color scheme. Yellow with black trimming is used on the Cloud Cruiser.

Adjusting and Flying

Before free flights are attempted, it is advisable to put the model through a series of gliding tests by hand-casting from vari-

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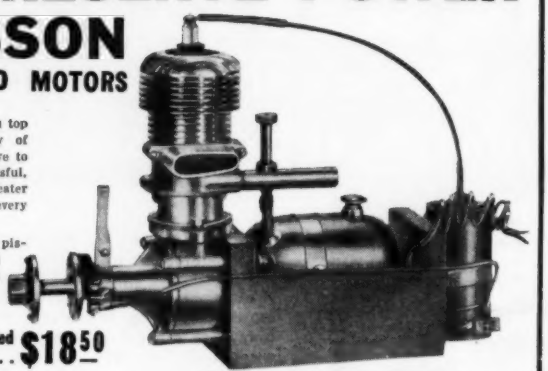
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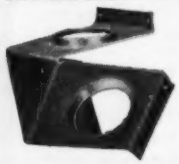
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ous heights. The reaction of the model can be observed, and adjustments made accordingly.

The settings on the original model are; left wing, ⅛" drag; right wing, zero; elevator, zero; fin set ¼" to the left; rudder, straight.

With these adjustments the model flies to the left and glides to the right in large circles.

Here's a New Weight Rule Contest Plane

(Continued from page 7)

about the rear of the fuselage. The main support at the root of the gull will be three one-sixteenth inch pieces of music wire sweat soldered together. The ends of these wires extend out a ways on the center spar to which they are firmly glued. One-sixteenth inch pieces of music wire also connect the leading and trailing edges. To prevent twisting, the flat center section is cross-trussed with one thirty-second inch music wire, and the gulled part of the wing with one thirty-second inch strips of bamboo. If the builder believes the gulled section of the wing is weak it may be covered with one thirty-second sheet wood. However, it should not be necessary if careful workmanship is used.

The M-6 airfoil was chosen for the elevator because of its stable characteristics. At normal angles of attack (0° to +3°) this section supplies little lift, but at higher angles of attack (+7° or over) when the main wing is reaching the stalling angle this section is supplying more lift than it would at the lower angles. This added lift tends to bring the tail up, keeping the model out of stalling positions. Because of these characteristics it is desirable to have a true M-6 section to the very tips. The method of making these ribs is clearly shown in the plans. The elevator is made in two separate panels. They are removable and adjustable. By being removable a narrower box may be used for transporting the model. They are made adjustable in angle so that various angular differences between the wing and elevator may be tried. A one-eighth inch hardwood dowel, which is built into the fuselage, fits into a piece of three-sixteenth O. D. aluminum tubing, which is firmly glued to the root rib. This piece of aluminum has a series of holes the exact size of a pin punched in it. They form an arc the radius of which is one and three-eighth inches. A pin inserted through one of them into a piece of one-sixteenth inch aluminum tubing in the fuselage holds the elevator at the desired angle.

The propeller is a very important part of any model. Its efficiency depends entirely upon the care given to its design and the workmanship put into its construction. The wood should be straight grained and of nine or ten pound stock. Care must be given to see that a true airfoil is produced and that both blades are identical. The finished blades should be given a coat of wood filler and sanded down to ten nought. A high polish may be put on by the usual method or the blades may be covered with aluminum foil for flashing visibility. The free wheeling device is concealed under the hollow spinner. It is suggested that a feathering propeller such as is described by Marvin Setzke and Carl Goldberg in the *Model Aeronautics Year Book* by *Frank Zaio*, be used. This system has been tried by a number of members of the Chicago Aeronuts and has been proven less drag than free wheeling.

Three-sixteenths inch M.R.L. brown rubber was chosen as power for several reasons. (1) It gives slightly greater torque than does one-eighth rubber. (2) It does not break as easily. (3) Total number of strands to handle is less. However, the total number of turns available is cut slightly, but the advantages gained out weighs this loss. Forty-four inches of twelve strands will be sufficient; the slack is taken up by a rubber tensioner. The weight of the individual model will probably vary from the calculated weight. To compensate for this the length of the rubber is either increased or shortened at the rate of one inch for every .0406 oz. For example; if the model weighs .2 oz. too much, the rubber is shortened five inches. To some model builders this amount of power may seem too small, but bear in mind that the model is streamlined and the propeller pitch low. To obtain the best results use a good grade of rubber lubricant.

As yet few models builders have built and flown models of the new weight rule; therefore, each individual must discover and work out any new problems that will arise. The wise person is going to begin soon so that when the Nationals come rolling around he will be in trim, with plenty of flying experience to help him carry the trophies home. When flying a model of this type, remember it is going to be powerful and fast. Take plenty of time glide testing it, be sure everything is okey before trusting it with power. If possible do not use any offset thrust. There will in all probability be a few bugs in adjustment to be worked out. If so, go about the problem sensibly, think it out carefully, because a moment's rashness may cause a hopeless crackup.

All comments, corrections or criticisms of this design will be greatly appreciated.

Bill of Materials

2 Fuselage blocks—2½"x3½"x32"—(6 lb.)
1 Propeller block—1⅛"x1¼"x16"
3 Sheets 1/16"x2"x24"—Ribs, etc.
1 Sheet 3/32"x3"x24"—Spars and rudder
1 Sheet ⅛"x2"x24"—Wheels, leading edge, etc.
1 Sheet ¼"x2"x24"—Trailing edges, etc.
3 Feet 1/32" music wire
3 Feet No. 54 music wire—Landing gear, etc.
Jasco BB washer
3/16" Aluminum tubing
⅛" Hardwood dowel
1/32" Aluminum sheet
1 sq. ft. 1/32" Jasco birch plywood
Japanese tissue
Glue
Banana oil
3/16" M.R.L. Brown rubber

Data

WING—Span 49.55 in., area 182 sq. in., section R.A.F. 32

FUSELAGE—Length (prop. tip to tail) 34 in., cross sectional area 12.12 sq. in., motor base 26.5 in.

ELEVATOR—Area 71 sq. in., % of wing 38%, section M-6

RUDDER AREA—Approx. 24 sq. in., % of wing 13.3%, section symmetrical

PROPELLER—Diameter 16 in., pitch 21 in., 1.31 P/D ratio.

RUBBER—12 strands three-sixteenths flat 44 in. long.

Weights

FUSELAGE	2. oz.
WING	.8 oz.
ELEVATOR	.3 oz.
PROPELLER	.6 oz.
RUBBER	1.8 oz.
	5.5 oz.
REQUIRED	5.46 oz.

Our International Classic

(Continued from page 9)

And so, the Wakefield Cup made its fourth trip across the Atlantic.

Eleven months slipped by since we said good-bye to the boys, and we are again on the eve of another international Wakefield competition. All of us are wondering just how it will turn out this year, especially with the changes in the rules which were compiled to bring out the best a model has. The exact wording of the official rules is as follows:

1st August, 1937

WAKEFIELD INTERNATIONAL CUP CONTEST

(Fairey's Aerodrome, Hayes, Middlesex)
Centralized Competition
Commencing 11 a.m.

PRIZE

Winning Nation to hold Cup for one year

Conditions and Rules

1. The competition shall be open to all nations whose teams shall consist of not more than six individual competitors.

2. Contest to be for fuselage rubber-driven models. The rubber motor of which must be concealed and the fuselage or fuselages must be fully covered and conform to the formula:

$$\frac{(\text{Overall length of model})^2}{100} = \text{Area of}$$

maximum cross section.

3. The following conditions must be complied with, regarding area and weight of model. (a) Total area of mainplane (planes) to be 200 square inches with plus or minus tolerance of 10 sq. inches (Area being projected area of cambered surface viewed from above whilst in position.) (b) No model shall have a total weight of less than eight ounces.

4. The competition shall be for duration of flight, such duration being taken from the time model is released until it first touches some solid object, after flight, or until passing out of sight of the judges.

5. Each model must rise from the ground from a stand still entirely under its own power, transmitted by Air Screw (Air Screws); no push whatever permitted.

6. Each entrant shall be allowed three attempts during the competition; the average duration of the three attempts to be counted.

7. When called by judges each model must be ready for flight within three minutes or the entrant will be liable for disqualification in that round.

8. Minor adjustments may be made between competition flights but trial flights will only be made with the consent of the judges.

9. Machines entered must be constructed by the entrant.

10. The judges' decision shall be final.

11. The winning nation shall be that which attains the highest average duration of three flights made by any one individual competitor of its team.

Bowden International Trophy for Power Model Aeroplanes

August 2, 1937

1. Contest open to all nations and all

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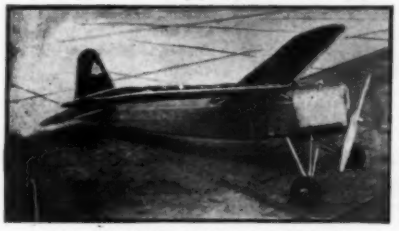
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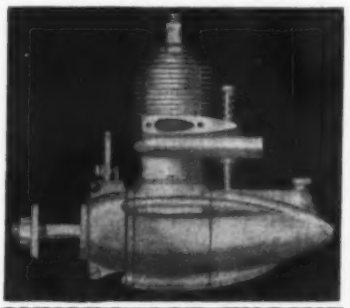
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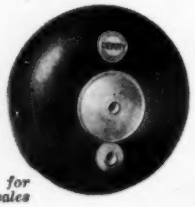
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types of petrol-driven models, except "stick" fuselage type. Foreign machines may be flown by proxy.

2. Each entrant will be allowed three flights; 30 marks being possible for each. Each flight shall be not less than 40 sec. and not more than 1 min. 30 sec. duration. Any variations from these time limits will result in a total loss of marks for that flight. Models must R.O.G. without push or assistance.

3. Immediately after each competitor's last flight a judge will inspect the model and if it is found undamaged from its original inspection, will be awarded 30 extra marks; very slight damage 10 extra marks; damage other than slight will disqualify for extra marks.

4. Repairs will be allowed between flights but will disqualify for extra marks as of above.

5. The competitor awarded the highest number of marks to be adjudged the winner.

6. The winner to hold trophy for one year.

Although the effect of the increased wing loading is of paramount interest, we will first clear up few rule technicalities before we go into detail of how to surmount the half pound weight rule. In all international competition, it is necessary to abide by the rules to the letter. This means that if you are in doubt as to whether or not your design will comply with the above rules, you should send your designs to the contest director for an approval. This is meant particularly for those who are developing abruptly thickened fuselages or counting portion of the wing as fuselage cross section.

The $\frac{(\text{Length})^2}{100}$ cross section rule is for the distance from the front of the propeller to the rear of the model. The wing area counts for the effective surface. See sketches for clarification. Specifically, the effective area is the portion of the wing which definitely contributes to the lift.

The major change in the rules is the minimum 8 oz. weight requirements. This means a wing loading of .29 lbs. per sq. ft., almost as much as a light gas model. What to do about it? The best solution is naturally to add this extra weight in the form of rubber. This can be done by using extra long and thick rubber motor, gears, or multi-prop designs.

The simplest solution is to use a single motor with rubber tensioner device to keep the rubber under tension when the power is almost expended. The rubber tensioner is a British invention and it had considerable influence in the 1936 results. The sketch shows the exact construction. Just be sure that it works well without putting too much friction on the shaft.

The only gear assembly worth while in the writer's opinion, gathered from experience, is the return gear type. This will allow enormous rubber length if used in conjunction with rubber tensioner, There is an efficiency loss in the gears but we are at least assured of a good initial burst of power by the upper direct motor drive. The gears in the front cause bent shafts when the models land awkwardly. Of course a universal joint or a rubber connection could be used but such additions will complicate the structure considerably.

The multi-prop idea is secondary as we have had little experience in twin tractor designs. Those that were made did not turn out so well in comparison to the standard design. The push-puller has possibilities and it will undoubtedly bid strongly for a place in the sun during the coming years, but it also has wrinkles which should make one hesitate to build one in a hurry.

The power used should be in the neighborhood of 20 strands of ⅛ or its equivalent. This power can be used in combination with a 16" diameter prop of 26" pitch. This arrangement will give a good initial climb and sufficient cruising speed. Of course, the exact propulsion combination depends a great deal on your design. A well streamlined model will naturally fly on lower power or a higher pitch prop, while an ordinary blunt job will need more power or a lower pitch prop. If you must increase your weight considerably in the form of rubber, be sure to increase the pitch of the propeller and the dihedral to take care of the increased torque. The maximum to work for is to have the model land dead stick on anything over 300 turns. From the above, we can see that the fuselages will have to take plenty of punishment as the boys will undoubtedly wind up to the limit.

The recommended fuselage design is the all-sheet balsa construction. This can be done in several ways as shown in the sketches. The elliptical or round cross section designs are rather difficult to construct, but there is nothing hard to the multi-flat sided type. The main consideration in flat sided fuselages is to use only quarter grained stock. Other cuts will not keep shape, liable to twisting, and they must have stringers for proper rigidity. In making balsa fuselages, be sure to be generous with cement.

The ordinary framework fuselages must be beefed up considerably by using 5/32 sq. longerons, filling in or covering with balsa wherever much handling is done such as the front and rear plug sections. Bamboo paper makes an excellent covering. A double and cross-grained of ordinary paper will also do.

As no pushing is allowed to start the model off, the ground stability must be assured with wide treaded and strong landing gear. A double rudder will help in keeping the rear from straying away from the runway course.

The wire parts should be made of $\frac{1}{16}$ dia. wire. Sketches show several safeties which must be used on all high powered jobs. 20 strands or more of tightly wound rubber is a vicious weapon, and if it is let loose with the "S" hook hanging to one end, no one can tell what will happen to hands or model. So be sure to safety everything that needs its, and use cambric tubing to prevent rubber chaffing.

Heretofore, the wing design usually called for a high aspect ratio. Their superiority shows up well in gliders and power ships but for model work it is questionable. It would seem that we should use a fairly large wing section to influence the air stream to a greater extent. Small chord, such as 3", have hardly any section to speak of, so close do they approach to the flat plate. Eight inch center chord is none too large if the outline is of elliptical shape. A 7" center chord will give a 42" span, if 3" of the center portion is faired into the fuselage. Whatever your design is, do not use a smaller section than 4". The airfoils vary from Clark Y, RAF 32 to modified McBride B7 as used by Roy Marquardt. Whatever section you do use, remember that incidence has a great deal to do with the performance.

The logical wing construction is of framework and paper covering type. Balsa covering adds too much weight as

well as making adjustments difficult after it is made. A balsa-covered leading edge will strengthen the job considerably as well as present a good entry to the air stream.

The lifting tail is now almost universally used. A 40 per cent stabilizer is none too large to use, especially if it can be made to carry part of the load. The tail setting will very likely be zero or a bit negative to bring the C.G. almost to the trailing edge of the wing. An adjustable downthrust adjuster is very essential to take care of power and glide difference. The first test consideration should be the glide and then the power flight which is brought under control with the thrust adjuster.

The testing of such heavy jobs is almost identical to gas models. Leave them to take off under their own power. The most important test is of course that which takes place under full power. Since this is a rather dangerous procedure as your testing ground is restricted by the possibilities of a lost model, a full power flight may be assimilated by dividing the motor into two portions with a ring at their union. All that is now necessary is to insert a pin through the ring and fuselage sides to wind only the front portion of the motor while still keeping the identical weight distribution. (This scheme is a modification of Louis Garami's indoor low ceiling flying stunt.)

With the design more or less cleared, our problem now is how to make it possible to have personal representation from the United States at the August 1st competition in England. There is no reason why we cannot follow the English plan of the National contribution scheme. This drive is already in force. Mr. Johnson, publisher of MODEL AIRPLANE NEWS, started the ball rolling with a handsome sum of $100.00. Your contribution, no matter how small will be of great use. The minimum that is needed is about $2000.00 for a team of six. Here is your chance to do something for the model game which has unquestionably done many things for you.

The contributions may be sent direct to the MODEL AIRPLANE NEWS offices. Try not to let this opportunity pass as we simply must reciprocate the British visit. Won't you feel rather terribly if you should happen to be one of the lucky six and then find that we are way behind the needed sum? If you don't place, you will enjoy reading about what happened to the boys who did.

Incidentally, coincidental with the Wakefield meet, there is an additional contest the next day for the gas model glories. This is also for international trophies offered by Capt. Bowden. Also cash prizes. Since it is out of the question to send gas models to be flown by proxies because of shipping and custom difficulties, it is doubly important that we get that sum together to show to the world that we have what it takes to make champions, so,

Cheerio! See you in London!

Frontiers of Aviation

(Continued from page 15)

square foot which should give airplanes very wonderful performance.

But that is something to come in the following months. In this very month however there are many new ships that are worthy of your attention. The most interesting—the XB-15 Boeing bomber, the swiftest—the Hawker light bomber, the largest—the new Maxim Gorky, and the smallest—the new Kling racer. We have already said much about the latest four-engined Boeing bomber and it has come forth just as predicted. It dwarfs Boeing's 299 bomber of which 13 are to be used by the Army with further orders impending. Four huge Pratt & Whitney twin row engines of over 1,000 hp. each pull the giant through the air at phenomenal speed. In general it looks similar to Boeing's former bombers. Truly a mid-wing, it has a low hanging "belly" with plenty of room for bombs and men. Far up in the nose is a gunner's enclosure. Aft of that is the pilot and co-pilot cab and directly below that is another streamlined machine-gun turret. On top the fuselage at about the center of the wing chord is still another turret. Then there are two, one on each side of the fuselage just aft of the wing. Still another is located under the belly near the tail. It is the first plane to carry a 110 volt alternating current electrical system as standard equipment. Without a doubt, the new Boeing is the greatest air weapon this country has ever had. Its performance goes unchallenged by any other country in the world. The giant bomber was completed last month and should be undergoing test flights as this is read. Though it is now well known that Boeing is building six large flying boats for Pan-American Airways, many four-engined land transports and two types of four-engined bombers a still larger airplane is well

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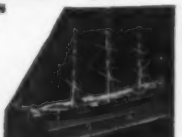


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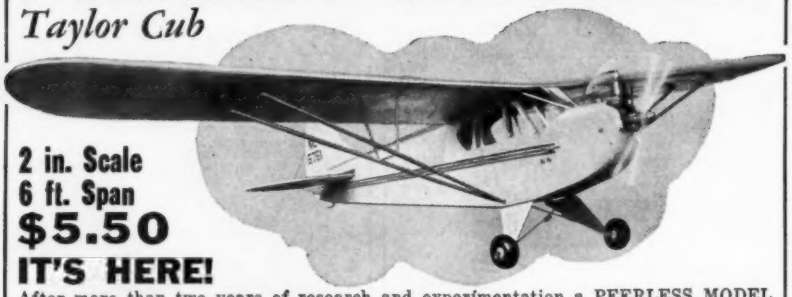
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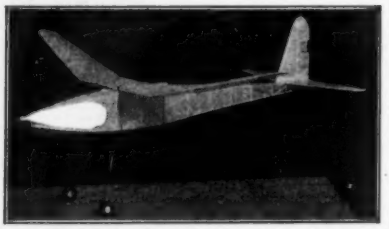
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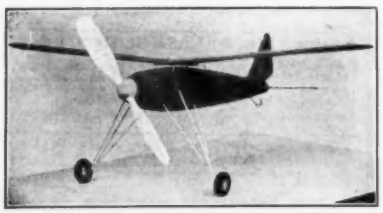
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AERO GLIDE—Wingspan 41", length 30", wt. 3 oz. Kit contains all parts to assemble folding propeller—MAMCO BALL BEARING propeller shaft—M & M model wheels—special brown contest rubber motor—glue, dope, tissue, wing ribs and other parts printed on "AAA" sheet balsa—all strips cut to size—full size detail 3-view drawing.

"Aero-Glide" Kit complete $2.25 Postpaid

Douglas-Designed Aerobat with Automatic Folding Prop. Span 26", Length 19". Kit Complete $1.25.



Span 30", Length 25", Wt. 2 oz. Kit contains full size plans, wing ribs notched and cut to shape, body formers and other parts clearly printed on "AAA" balsa, turned spinners, glue, dope, red tissue, rubber motor, special designed real FREE WHEELING PROP. CUT TO SHAPE. WORKS perfectly every flight. This model has ALTITUDE-SPEED-ENDURANCE and a perfect GLIDE, with M & M Airwheels for SMOOTH LANDINGS.

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under way—a 70 passenger flying boat for Atlantic service!

Another mid-wing airplane that we like very much is the new English two-place light bomber which also has a low hanging belly. The power plant is one of those Rolls Royce Merlin engines and as usual gives the airplane very swift-looking lines. The crew enclosure is very well designed and has a good shape. The wing is of the usual "British" taper housing a retractable landing gear. The ship is probably the outcome of Hawker's single-place low-wing pursuit built last year and appears to be about the same size.

The first of the new Maxim Gorky type six-engined giants should be finished with another almost completed according to information just received. The planes are being built in Russia and should be the largest in the world. They are of high-wing design with all six engines located in the leading edge of the wing. All-metal construction is employed.

Rudy Kling was minus just one good racing plane last year when the National Air Races terminated. He cracked it up when landing it into a pylon. Since then he has been working on a new and always "a better" one. He has ordered Al Menasco's largest engine, the Super-Buccaneer which delivers up to 290 hp. so that new racer of Kling's should be mighty fast. We hope he will be able to beat Detroyat with it this year.

Harry Crosby's new racer is still in the wind tunnel stage. A model has been built of aluminum alloy of the proposed plane for testing. The ship will be similar to Crosby's former one except for better streamlining. The fuselage may be fatter with even smoother contours than his former ship. Newspapers say that Harry Crosby will endeavor to break Howard Hughes' landplane speed record.

It is more than likely that Roscoe will be in the Bendix and Thompson Races this year. According to Roscoe Turner he and his own staff supervised the designing of his ship. However, unforeseen difficulties have occurred which we hope will be smoothed out shortly.

Benny Howard who has been recuperating at Palm Springs after his disastrous plane crash last year will start plans for a new Bendix racer which should be ready for the 1938 National Air Races. He may also be a pilot on United Airlines' special Boeing that is now equipped for experimental work.

According to Walter Winchell, Roger Q. Williams is having two new planes built on Long Island. They will probably be used for long-distance hops or perhaps the New York-Paris Race.

Howard Hughes has ordered a new Sikorsky amphibian which we understand is much different from the present S-43. It will carry huge fuel tanks and so far the only guesses that have been forthcoming are that it will be used in the New York-Paris Race or for a flight around the world.

Caudron's latest racer is one with an in-line engine of 570 hp. we understand. It will be flown by Delmotte in an attempt to break the world landplane speed record. Its appearance is the same as other Caudron single-engined racers. The Caudron concern also has completed a pursuit plane adopted from their racers. It is known as the C.170 Requine and has a 450 hp. engine capable of pulling the ship at over 300 m.p.h.

There are reports, though not well founded, that Cecil Allen's ill-fated Gee Bee will be rebuilt again! The employees of the Consolidated Aircraft Corp. have built a small low-wing racer.

North American Aviation is still receiving large orders these days. They have received one from Argentina for training planes. The Army recently bought 73 basic trainers which are said to have retractable landing gears. At Dayton bids were received on basic combat planes in lots of 25 as follows: North American $13,580 each, Seversky $27,800 each, and Northrop $24,301 each. In lots of 150 they were North American $12,920, Seversky $19,300 and Northrop $20,188 each. Prices for engines ranged from $4255 to $9100 each and accessories $5100 per plane. The engineers at North American have considered putting a nose wheel on their twin-engined bomber now at Dayton.

The Brewster Aeronautical Corp. which issued stock at $5.50 per share a few months ago made it known that they have received contracts from the U. S. Navy for building and designing a new experimental scout bomber and a single-place fighter.

Curtiss and Seversky are reported to have new pursuit airplanes undergoing tests at Dayton for future Army orders.

Something "hot" is expected to come from Curtiss-Wright's St. Louis plant within the year.

In the shops of the Timm Aircraft Co., their new twin-engined transport is well under way and there is a possibility that it will be completed sometime during July. There are many unique features about the

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IS A SUPER QUALITY model that is scientifically designed that will give amazingly long flights, either from the hand or off the ground. All parts of the Moth are beautifully moulded in the form of light, hollow shells, perfectly shaped and fully detailed. The fuselage shells are firmly fused together, forming a perfect, crashproof fuselage. All wing surfaces are moulded to the correct wing curves and are completely finished. The moulded hollow streamline struts are remarkably strong when cemented together. The "Moth," when assembled is practically crashproof and will stand up under the most severe flying punishment. Be the first to FLY the MOTH in your neighborhood. Ask your dealer—if he can't supply you send direct $1.50 plus 15c postage.

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ship. One is that there will be a nose wheel just forward of the pilot cab and will be steered hydraulically. Tests are now being made to see if this will be entirely practical. The ship is of high wing design with the two Wright Whirlwinds located in the leading edge of the wing. The overall height of the Timm is very small and it should be exceptionally fast. Top speed should be about 210 m.p.h. with full load of six-eight passengers. We will bring further details of this plane from time to time. A staff of six men of which yours truly is a part have been working on the design of the transport. Handley-Page slots and flaps are also a feature of this plane as we have related in past issues of MODEL AIRPLANE NEWS.

Menasco has received an order from the Focke-Wulf Company for one of their 150 hp. engines while Bellanca has ordered two 250 hp. engines for their new ship which verifies our previous supposition that Bellanca's new twin-engined plane would be Menasco-powered.

Another new Bellanca creation is what the company describes as the 17-20, an ultra-modern 5-place single-engined cabin plane for the price range below $10,000. It is a full cantilever low-wing monoplane with retracting landing gear and wing flaps. It will be for the private owner, having high performance and low operating costs. There is a story now the rage that Bellanca is building twenty airplanes for France.

Vultee has received another $3,500,000 order from an unknown foreign country. Maybe it is Russia.

In Los Angeles the National Aircraft Co., has been organized for the production of airplanes.

We feel quite proud that our own Glenn L. Martin Company received a large order for military planes from Argentina. The Martin plane was in competition with companies from Europe and won the order. Martin's latest Clipper is about ready for a purchaser. From reports it seems that it will go to Pan-American for trans-Atlantic service though we had surmised that this was the one ordered by the U.S.S.R. Specifications follow:

Span 157'
Length 90' 7"
Power loading 18.2 lb./hp.
Wing loading 27.1 lb./sq. ft.
Gross weight 62,000 lb.
Top speed 190 m.p.h.
Cruising speed 160 m.p.h.
Capacity (passengers) 53
Engines 4-840 hp. Cyclones.

The twin-engined Kinner which has been in Kinner's hangar for almost a year in the nearly completed stage may be completed shortly if a purchaser is to be found. It looks like a good little ship but for some unknown reason the company has not gone ahead with it.

Specifications of the Douglas DC-4 are as follows:

Span 138' 3", Engines 4-1350 hp.
Length 97', Top speed 237 m.p.h.
Height 24' 4", Landing speed 68.5 m.p.h.
Passenger capacity 40, Range 2,200 miles
Crew 5, Gross weight 60,000 lb.
Useful load 20,000 lb., Cargo 6,500 lb.
Absolute ceiling 24,000', Service ceiling 22,000'
Fuel capacity 2,200 gal.

How to Build a Scale Model of the Curtis A-18 Attack

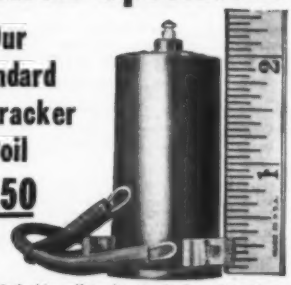
The Curtiss Attack is one of the latest acquisitions of the U.S. Army Air Corps. Thirteen of these ships are now being built for service tests and many more are destined to be ordered in the near future. Build the entire model of balsa wood which may be purchased in a model shop or department store. Get dimensions from plans. If you wish to square off the plans affording easier measuring, join the corresponding dashes on the border with straight pencil lines. Each square will equal four square feet.

Make the fuselage first. Draw the side view on stock with the grain of the wood running lengthwise. Cut to shape with

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$2.50



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BIG SHOT ignition coil made for larger ships, boat engines, etc. Suitable for high-compression engines with speeds up to 20,000 R.P.M. All lead wires fastened with approved terminals. Weight 5½ ounces.....$3.50

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1/4 x 1/2.....1 for .14
1/4 x 1.....1 for .17
1/4 x 3.....1 for .45

Balsa
5 Ft. lengths

1/8 x 1/4.....4 for .10
1/8 x 1/2.....3 for .14
1/8 x 1.....2 for .17
3/16 x 3/16.....8 for .25
3/16 x 1/2.....2 for .10
3/16 x 1.....2 for .19
1/4 x 1/4.....6 for .25
1/4 x 1/2.....4 for .25
1/4 x 1.....3 for .25
1/4 x 3/8.....3 for .25
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1 x 1.....1 for .25

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36" or 18" length of gas model balsa can be had. See our regular list of model supplies above. Please mention its use.

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16".....$1.00

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a jig-saw and then draw top view. Cut once more and then round out the fuselage with a small sharp chisel as shown by cross-sections. A razor blade is also good for cutting the balsa wood.

Go over the surface with coarse and then fine sandpaper. Use this same procedure in making the two wing panels, the tail, cowls and engine nacelles. Take plenty of time and be accurate. Care must also be taken when assembling the parts.

When all are completed lay the fuselage in flying position on a flat surface and join the wing panels. Apply plenty of model cement to the joints. Lay blocks under the wing to hold it in place. In joining the engine nacelles to the wing it is best to split them in half horizontally from front to back with a razor blade. Be very careful that you do not cut your fingers in this operation. Then cut out the necessary amount of wood so the top and bottom of the nacelles will fit the wing snugly. Cement them in place and join the engine cowls. Also join the tail units to the fuselage. While those connections are drying shape out some landing gear struts as shown by plans from scrap wood with your razor blade. It is preferable to purchase the wheels which may be done when buying the "dope." The tail wheel may be made however from scrap wood and put in place as well as the two props. Join the landing gear struts in place and then go over the entire model with fine sandpaper.

The model will be painted the standard Army colors. The engine nacelles and fuselage will be blue, the tail and wing yellow. The windows in the fuselage should be doped white and the fronts of the engine nacelles and the wheels that are to be put on must be black. The vertical band on the rudder is to be painted blue and the others alternately red and white. The star in the insignia on the wing is to be white with a red circle in the center and a blue background. Many coats will have to be applied before a smooth finish is obtained because balsa wood is very porous. However do not apply a second coat until the first has dried. When the paint job has dried the model will be completed.

Air Ways

(Continued from page 39)

model building is in all parts of the globe. This is a very interesting ship and does not follow regular construction, for it is made with two fins, located on each end of the stabilizer.

England

We hear from Harry York, a member of the Society of Model Aeronautical Engineers of England. He tells us that we made a typegraphical error in reference to the wing area for Wakefield models. The wing area must be from 190 to 210 square inches; not from 120 to 210 square inches. Mr. York is one of the group who came over to the 1936 Wakefield Contest held at Detroit, Michigan. He is looking forward to seeing many of the young friends he met here at the 1937 Wakefield in England.

CLUB NEWS

Illinois

We have word from Edward Lidgard of 8209 South Paulina, Chicago, Illinois, of the Chicago Aeronuts, that this club is contemplating a flight with a gas model across Lake Michigan. This appears to be an ambitious undertaking and we will await the news of the outcome with great interest. Mr. Lidgard tells us:

"An unusual feature of our meetings is the hour and a half session of basketball in the park gym after the meeting. We feel this is important, for in any model or similar organization, there is a tendency toward one-sidedness. This means of diversion also assists physically, as most of the members are either hunched over a school desk or work-bench all week."

As usual, the Aeronuts are pioneering with their work on helithopters and ornithopters, which is most interesting. Probably it is due to building this type of machine that they find it necessary to take up basketball as a means of exercise. The good old-time model builder who flew for distance or duration usually got plenty of this healthgiving element through the necessity of chasing his ships all over the countryside.

Late news comes that Carl Goldberg, who is a leading member of the club, is experimenting with a microfilm wing flapper which is noiseless. When this is perfected indoor ships are going to look more like Jersey mosquitoes than ever. Those who are familiar with this type of ship can probably visualize an armory with the air full of gauze-like wing rubber powered insects flitting here and there. It should resemble a perfect reproduction of a Jersey nightmare.

New York

The Rochester Squadron of the National Aero Reserve, sponsored by the Rochester Times-Union, will hold an outdoor contest at Genesee Polo Park during June. The exact date will be announced shortly in the Times-Union. All modelers in Rochester or vicinity are invited to compete.

Three events—stick model endurance, flying scale model, solid scale model. Prizes—gasoline motors, compressed air motors, gas model kits, books, and medals.

Iowa

The Marshalltown Junior Chamber of Commerce is sponsoring the 1937 Ace Model Club Air Race. The Ace Model Club held its first contest last year under different sponsorship. The contest was such a good success that it was decided to try to hold one annually. The contest this year is to be state-wide. Every model builder in the state is cordially invited to attend. There will be two divisions, Junior and Senior. Two beautiful trophies, one gold and the other silver, will be awarded to the winners. The contest will be held Sunday, July 11. For complete information model builders should write to the Ace Model Club at 19 South Center Street, Marshalltown, Iowa.

Ohio

Here is a report of the recent activities of the Edith Van Orman chapter, Junior N.A.A., sponsored by the Akron Women's chapter, N.A.A.

To stimulate interest in an increased membership in the Junior N.A.A., Mrs. O. J. Clare, chairman of Junior Activities, has instituted a series of Novice Contests. The first Novice Contest was held Saturday, February 20th in Goodyear Hall. Prizes were Junior N.A.A. memberships, and were awarded to the following:

Pershing Kaufman, Renford Hill, Edmund Vorhees, Aris Franklin.

The next Novice Contest was held Saturday, April 3rd, and prizes were memberships in the Junior N.A.A.

The first of the two Annual Indoor Contests for Junior N.A.A. members were conducted April 24th, in the Goodyear-Zeppelin dock.

The most important recent event, in the eyes of the boys, was the Annual City Wide Meeting and presentation of trophies, held in the Perkins School Auditorium, Wednesday, Feb. 17th. Mr. Earl Caves, president of the Senior Council, Edith Van Orman chapter, Junior N.A.A., presided. (Mr. Caves is sponsor of the model plane builders at Garfield High, and is very proud of the World's Record made by one of his boys, Bernarr Anderson.) Music was provided by the Garfield High Band. The speaker was Mr. Clarence O. Bell, airplane pilot. Trophies awarded to contestants holding highest records of the year were presented by Mrs. W. W. Milar, Hon. President of the Akron Women's chapter. Mr. B. E. Fulton, Mgr. Akron Municipal Airport, presented the Akron Merit Plan certificates. No meeting of the boys would be quite complete without a "pep" talk by Mr. H. M. Jellison, National Contest Director.

Massachusetts

One of the best things to appear in "Wing Overs," the official organ of the Jordan-Marsh Boston Traveler Junior Aviation League, is the cartoon on the bottom of the first page of Volume 7, Number 11, entitled "Do these bugs hold back yours?" "Yours" refers to your airplane and "bugs" are poor adjustment, poor workmanship and poor design. This is a very fine thought stimulant and we hope that many fellows will take it to heart. Editor A. L. Lewis and his contributors are doing a very fine job with this little sheet.

The first gas model meet of 1937 to be held by the Boston Gas Model Society was run off at the Metropolitan airport, Boston, on April 11th. Up to the time we went to press we had no news of the results.

Readers may be interested to know that the 8th Annual New England Championship Model Plane Meet is scheduled for the latter part of May, probably on the 22nd and the 23rd. The contest is sponsored by the Jordan Marsh-Boston Traveler Junior Aviation League and is the biggest contest of its kind to be held in this part of the country. Any New England model builders may compete for the prizes. Contestants living outside of New England may fly their models but they are not eligible for any prizes. The usual indoor and outdoor events are planned. A cordial invitation is extended to all to compete in or witness the Meet. More detailed information may be obtained from Albert Lewis, Junior Aviation League, Jordan Marsh Company, Boston, Mass.

By writing to Mr. Lewis at the above address anyone may receive a copy of "Wing Overs" free of charge.

Pennsylvania

Gimbels Chapter of the N.A.A.

First contest to determine 2 boys to represent Gimbels in Detroit at the N.A.A. Nationals was held on April 17, 1937. If bad weather, postpone to April 24.

Contest to include Fuselage Class "C" and "D," Stick Class "C" and "D."

Second Elimination Date for contest to determine 2 boys to represent Gimbels in Detroit at N.A.A. Nationals will be May 15, 1937. If bad weather, postpone to May 22.

Contest to include same as First Contest.

Those interested in entering the elimination event should communicate with Mr. Robert K. Allen, Gimbel's store, Pittsburgh, Pa.

Cincinnati, Ohio

We wish to call attention to an active

(Continued on page 64)

Introducing **MEGOW'S**

new "fifty-centers"



AL WILLIAMS' famous "Gulfhawk"

50c Postage 10c extra

(State choice of ½-inch Scale or large wingspan flying model.)

An entirely new line of model kits produced in cooperation with noted fliers . . . and offering flying models of their sensational new high altitude and aerobatic ships. For the first time, model-builders may now make designs that are in the news of the day, either in exact ½-inch scale and detail or larger wingspan flying models, as they choose.

Send 5c for big illustrated catalog and special bulletins on this new line.

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THE 1937 MODEL BROWN JR. MOTOR



For model planes. Length overall 5¾"

New, improved model, made with the same fine workmanship that has made this motor famous for reliability and for performance.

NEW FEATURES

Improved precision construction, designed to give top performance—More compact. Requires less space—Improved gas tank may be cleaned easily—Skids may be removed without disturbing ignition wiring.

Shipped ready to run. See the 1937 model at your model airplane supply dealer's or write us for details.

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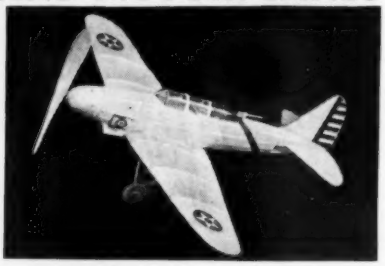
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CONSTRUCTION SETS

FLYING & SHELF SCALE MODELS

All kits complete — No extras to buy



24" Flying Model Construction Sets

181	Mr. Mulligan	191	Kinner Envoy 27½"
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183	Ryan Sportster	193	Stinson SR 8C-29"
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186	Fairchild Warner 22	196	DeWoitine 29"

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F 38	Art Chester Racer	F 44	Brown B3
F 39	Curtiss Coupe	F 45	Aeroneer
F 40	Vultee V-11	F 46	English Puss Moth
F 41	Fairchild 24	F 47	Fokker D 8
F 42	Curtiss Falcon	F 48	Polish Fighter
F 43	Boeing F4 B4	F 49	Spad

2 sets 35c Postpaid U. S. A.
If your dealer cannot supply you, order direct.

8" Shelf Model Construction Sets

N 38	Art Chester Racer	N 44	China Clipper
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N 42	Stinson Reliant	N 48	Hawker Fighter
N 43	Aeroneer	N 49	Seversky Pursuit

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No. 60 China Clipper	A4 Sikorsky 842
A2 Douglas Transport DST	A5 De H "Comet"
A3 Martin Bomber	A6 Douglas Observation

35c each Postpaid U.S.A.

PAUL K. GUILLOW — WAKEFIELD, MASS.

A Flying Bellanca Air Cruiser

(Continued from page 29)

in flying position. Put a small weight on top of the fuselage to prevent its moving around.

Cement each wing half to the corresponding fuselage side, putting books or something else under each wing tip to keep it in position until the glue has hardened. Check the dihedral angle, the angle of incidence of each wing half (making sure that both halves have the same amount of incidence) and the alignment of the wing to the fuselage. Take the ship out of the jig, cement the lower wing stubs to the fuselage, then glue the struts 1-K into place. Join the flying struts to the lower wing stubs and note the position to which the wire hooks 5-F should be cemented to the flying struts in order to preserve the proper alignment of the surfaces. When you have determined the proper positions for these hooks, disjoin the flying struts from the lower wing stubs and cement the hooks into place. When the glue has hardened, engage the hooks at the ends of the flying struts with the hooks in the wing, then once more join the flying struts with the lower wing stubs, putting a drop of cement at the leading and trailing edges of the joints.

Cement each pant unit to its corresponding lower wing stub so that the front struts of the "V" braces anchor to the front spar of the lower wing stub and the rear struts of the "V" braces anchor to the rear spars of the wing stub. Now cover each pant frame with 1/64" thick medium light balsa, then cover the unit with blue tissue. Cement the bamboo struts 1-L into place, after having painted them silver.

The cylinders are made of ¼" balsa dowel with black thread wrapped and cemented around it to simulate the cooling fins. Cut these cylinders to size and cement them to the nose of the ship as shown on Plate 2. The anti-drag ring (Plate 5) is made of either balsa or a light grade of cardboard. The cardboard is preferred in this case as it will bend easily and symmetrically without cracking, as the balsa would tend to do. After you have bent the ring to shape and cemented the joint, put it around the cylinders and see that it fits right. After you've checked the fit, dope some orange tissue to the inside and outside of the ring. This will both strengthen and decorate it. Fit the ring over the cylinders and cement it into place.

Propellers (Plate 6)

The flying prop is made of medium balsa. Join the blades as shown on drawing, then when the glue joint has hardened, carve the concave face of the blades. When this has been done, shape the blades as shown, then carve the convex face of the blades. The next job is to balance the prop. Push a pin through the hub of the prop, then, holding the protruding end of the pin with one hand, spin the prop over with the other hand. If it turns over evenly and comes to rest smoothly, the prop is balanced, but if it turns over jerkily and one of the blades causes a pendulum-like action just before coming to a rest pointing towards the ground, you'll have to sand that heavy blade and repeat the tests until the prop balances perfectly. Give it two coats of clear dope and two coats of silver dope. Sand lightly between coats. The last coat is not sanded, but left natural. Push the prop shaft through the rear of the nose plug, slip a few washers on the shaft, put the prop on the shaft, bend the end of the shaft to a "U" shape, and pull the shaft back so that the "U" sinks into the prop hub. Cement it firmly into place. (While making the flying prop, it is advisable to make the scale prop. You will note how much more realistic the ship looks with the scale prop than with the flying prop. When you're not flying the ship, you can take out the motor-stick with the flying prop and put the nose-plug with the scale prop on it and you have an attractive exhibition model.)

Slip 4 strands of 3/16" flat rubber on the rear-hook and prop shaft, put the motor-stick unit into the fuselage, and anchor it into place by pushing a pin through the anti-drag ring, top cylinder, and into the motor-stick (see Nosepiece Detail, Plate 2). The ship is now ready for the test hop.

Balance the ship by holding the wing with your index fingers about 1/3 back of the leading edge. The model should balance on an even keel. If it is tail heavy, add a bit of weight to the nose. If it is nose heavy, add weight to the tail. When the ship has been balanced, wind the prop about 75 turns by hand, raise the nose of the ship slightly and launch the ship. If the model has been built properly, it will make a fairly long gliding flight to the ground for a graceful landing. If the ship stalls, raise the leading edge of the elevator slightly. If the ship dives, raise the trailing edge of the elevator slightly. If it banks excessively, wash-in the low banking wing, wash-out the high banking wing, and give the ship some opposite rudder if necessary.

When the ship has been adjusted properly, remove the motor-stick from the fuselage, lubricate the rubber motor, attach an "S" hook to the rear of the rubber motor, hook the "S" hook to a mechanical winder, stretch the motor to about 4 times its normal length, and then give it as many winds as it will safely hold. Put the motor-stick back into the fuselage, pin it into place, then launch the ship on its maiden flight to the heavens. You'll get a big kick out of watching the smooth and graceful flight action of the ship, and the dignified attitude with which it comes in for a landing.

A free-wheeling device on the prop will tend to flatten the glide of the ship.

Gas Lines

(Continued from page 31)

give good performance. We trust that Mr. Zakim will not mind if we comment on his job in light of this. First, the fact that he has the stabilizer high on the fin is an excellent point, for when the tail starts to swing, the center of gravity of the tail being high, the ship will have a tendency to hold its bank and not bank excessively. The fact that the wing is down close to the body is, in our opinion, a mistake. A ship of this type never flies as consistently as one which is parasoled. In fact a parasol wing is, one might say, essential for stability and reliability. By this we do not mean that such a ship will not fly well on many occasions. What we say is the percentage of successful flights will be smaller than if the wing was parasoled. A parasol wing is another factor of the model which tends to give greater climbing ability and causes the horizontal tail surfaces to become a lift surface rather than a neutral or a depressing surface.

A point here regarding the line of thrust might be cleared up. The line of thrust should be high for good performance, that is higher than the center of gravity. How-

ever, the wing should be well above the line of thrust in order to produce a nosing up or climbing couple which may be resisted by the lift of the stabilizer. Such a combination causes the stabilizer to lift. If the wing is on the line of thrust or below it the stabilizer necessarily will produce a down pressure and not a lifting effect. Briefly, the line of thrust should be above the center of gravity and the wing should be parasoled well above the lein of thrust, if a climbing model is desired. When the wing is on or near the line of thrust the model becomes a speed type rather than a climbing type.

Mr. Howard A. Broughton of 1658 West 23rd Street, Los Angeles, California, has been kind enough to send us picture No. 6, which shows his Bunch "Scorpion Major" seaplane in full flight. Mr. Broughton has spent considerable time in developing this ship and he says:

"In order to operate from rough water, water stability was found to be of major importance, hence the more practical three float design. With correct float displacement, angular setting and disposition of the step, stability, reliability, safety in take off and landing as well as facility of operation are much better in a seaplane. The floats are planked with balsa veneer and internally trussed with vertical and diagonal bracing and bulkheads. Struts and float fittings are music wire. The floats are finished with silk covering and doped. The entire flotation gear is but slightly heavier than conventional air wheels and almost as streamlined. Flight performance is amazing when viewed over water.

"With this ship the take off run is about 25 feet. Landings are smooth and easy from a normal glide with absolutely no nose over tendency. In windy weather the ship has bounced as high as four feet from the water on the first contact without capsizing.

"The shock of even a good landing on water is more than can be realized and haphazard designs and workmanship will result in ever more disappointments than in land planes. However, this ship will land on either land or water without even breaking a prop. By using a mechanical timer it can be operated from a rowboat over a small pond."

Dick Korda of 3876 East 113 Street, Cleveland, Ohio, sends us a real action picture, No. 7. Here you see Korda's six foot gas job, weighing four pounds, making a steep bank on the take off. This depicts a moment during which model builders hold their breath and pray. The ship crashed but little damage resulted.

Perhaps this steep bank was caused by the fact that the center of gravity was well below the center of lateral area. This appears to be a very excellent illustration of what models do when such an improper combination of weights and surfaces exists. A very excellent method of showing the difference between a plane with the center of lateral area above and below the center of gravity is as follows:

Have a ship in which the center of lateral area is above the center of gravity and cement a vertical fin to the underside of the body right below the wing so that the fin extends beyond the tail and body. By doing this you are adding area below the center of gravity and are lowering the center of lateral area. Fly the model first without the fin, and then with it, and note the difference in the flight. The fin should be about three times as long as it is deep. The depth of the fin should be equal approximately to the depth of the fuselage, or at least two-thirds of this depth.

This experiment is suggested by your editor and should prove to be very interesting and enlightening.

UNIT NEWS

California

Elbert J. Weathers of 2720 Poinsettia Drive, San Diego, Cal., corresponding secretary of Unit 18, sends us some interesting notes about his club. The San Diego Gas Model Club-Aviation Advancement Club Contest, held on April 4th, had over 80 entries, all of whom were I.G.M.A.A. members. He sends us picture No. 8, which shows a number of the planes on the sidelines and gives a good example of the size of the crowds that attend gas model meets in California. Apparently there is "standing room only." The spectators were estimated to be 3000 in number. The ships were hampered greatly by a strong wind which rose during the meet. One of the highlights at the contest was when one ship which was built very light and had a great deal of power, took off and completed several perfect "loop the loops" and finally made a perfect landing in spite of such tactics. Alan Cummings of Los Angeles was the winner of this contest. He entered a flying scale model of the Italian Vale pursuit ship.

Massachusetts

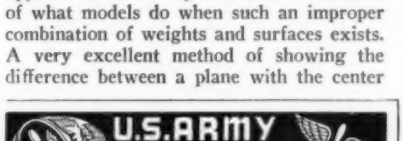
The Boston Gas Model Society, New England's largest gasoline engine model plane organization, and unit No. 68 of the I.G.M.A.A. held its first contest of 1937, Sunday morning, April 11, at the Boston Metropolitan Airport in Canton, Massachusetts.

Harold Thompson, of Lynn, Mass., captured the Will Rogers-Wiley Post Memorial Trophy with a flight of 2:59. His ship was an original high-wing monoplane powered with a Brown engine. John Jorgensen, of Beverly, Mass., took second place with a modified KG-3 equipped with a Brown with a flight of 2:32.8. Third place went to Frederick Rooke, of Swampscott, Mass., when his original high-wing Gwin powered monoplane remained aloft for 1:35.

Contestants at the meet were limited to 1/25 of an ounce of fuel per pound of weight. A corresponding timer arrangement permitted timer-controlled flights by some flyers.

A large number of spectators turned out for the battle, although flying conditions were none too good.

The officers of the society are Bruno Marchi, president; Mary Fowler, vice-president; and Albert Lewis, secretary-treasurer.



Beautiful and Durable Insignia Pins with Official Designs

Duplicate of Regulation Breast Wings; 1½" Spread; Oxidized Silver Finish on Heavy Metal—50c each Postpaid.
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FLASH! JUST OUT! FRANK HAWKS'

"Time Flies"

a 36" flying model

Enormously Detailed and Truly Scaled

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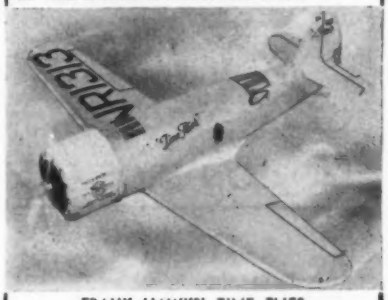
With These Amazing Features:

- Movable Controls (from cockpit)
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- Built up Double Banked Motor
- New Retractable Windshield
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and so many more that space does not permit us to list them all.

We give you all of these remarkable features with a wealth of detail—and, even more astonishing, we have not reduced this plane to such a pigmy and dwarfed size that would make it almost impossible to construct the intricate workings. No sirree. Unbelievable as it may seem, we have produced this model at 36" which even in an ordinary set would sell for three times the price.

It is a model of the super streamlined thriller that has held the aviation industry breathless by its spectacular performances in test hops. It is the one model you have wanted and the one set you have been clamoring for. No one but "BURD" would have undertaken such a feat and NOW "BURD" gives it to you as it should be—SIZE—COMPLETENESS—DESIGN—DETAIL—SIMPLICITY. Don't pass up the opportunity to build the greatest model thriller yet. Get yours NOW as we have produced ONLY A LIMITED NUMBER AT THIS SPECIAL INTRODUCTORY PRICE.



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The flashiest and most thrilling ship to take the air. Get the only authentic replica by "BURD." Super-complete in parts and details. This set contains the most exciting dollar's worth you've ever seen.

Suggested coloring, silver; blue and gold insignia—postpaid $1.00.



30" THERMALIDER SKYBURD

Here is the model that everyone has been asking for. A true endurance model that anyone can build. Five minute flights are not unusual. It has a fast climb to get it up there and a free wheeling prop to add minutes onto your endurance. Your THERMALIDER will show them all up in flying. Sleek, trim, beautiful in appearance. Be the first to fly one. Rush your order now. Construction set contains numerous parts and features.....50c postpaid.

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THE PERFECT MODEL GAS ENGINE FOR AIRCRAFT & BOATS

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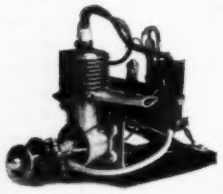
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NEW IMPROVED ADJUSTABLE SPARK

WEIGHT AS SHOWN 10½ OUNCES

ALL PARTS REPLACEABLE

EASY STARTING



GRAVITY FEED

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SPEED RANGE 500 to 7500 RPM

THIN STEEL LINED CYLINDER

ONE PIECE ALUMINUM ALLOY CASTING

HIGH SPEED BRONZE BEARINGS

Performance, workmanship and material absolutely guaranteed. Priced to you complete as shown with coil, condenser, fuel tank, and engine mount for only **$11.95.** The *only* midget gas engine on the market featuring a one-piece aluminum alloy crankcase and cylinder casting (eliminating leaky gaskets and loss of compression). Due to the perfect fit of piston in the steel lined cylinder and the high speed bronze bearings, the MORTON CHALLENGER will give you many hours of satisfactory and snappy performance. Send full amount or $5.00, balance C.O.D. *Order Now!*

MORTON BROS. Dept. M7 KEARNEY, NEBRASKA

Picture No. 9 shows Mary Fowler, vice-president of the society, with Hewitt Phillips' gas model of low-wing design. The wings and engine are held in place by small pegs or shear pins which break when rough landings take place. This saves the structure of the ship. It is powered with a Tlush engine.

New Mexico

We have news from Unit 29, the Albuquerque Gas Model Association. Bill Denison, president, and Lee Erlandson, secretary, write as follows:

"The official contest scheduled for April 4th had to be postponed until April 11th because of a snow storm. The postponed contest of April 11th had to be put off once more because of gusty winds which sprang up before the contest was half over. At the time the contest was discontinued George Faber was leading with Bob Seth close behind him."

Picture No. 10 shows a line-up of some of the club members and their planes at the contest. In light of the location and character of the flying field shown in the picture, we might suggest that this club call themselves "The Sand Fleas." Gas model builders in this part of the country certainly have it over the easterners when they can use such excessively flat stretches of territory.

Recently the club held an assembly before the Washington Junior High School which turned out to be a big success. George Brown, a member, has donated a large silver cup as a rotation prize.

The club has formed a policy of having talks given by different members of the club at the meetings on various subjects pertaining to gas modeling or real aviation and these have really been made very interesting.

Illinois

Picture No. 11 shows the first annual Gas Model Show which was held by the Central Gas Model Society of Chicago, Illinois, at the Hotel Sherman of that city. The exhibit was claimed by many to be the finest gas model exhibition ever held in the neighborhood of Chicago. It consisted of an aggregation of more than fifty gas models built by members of the society, together with displays of kits, supplies and motors from most of the prominent gas model manufacturers. The show was free to the public and marked the end of the first year of the society under its state charter. It is estimated that 20,000 people visited the show. Exhibits ranged from a three and a half foot Puss Moth built by Pat Sweeney and powered with an Elf engine, to a ten foot bi-motored DeHavilland Comet powered with two Brown Junior motors. There were other models, such as S.E.-5, Cessnas and Monocoupes.

Washington

Unit 57, the Yakima Gas Model Club, with headquarters at the Y.M.C.A., Yakima, Washington, now boasts of a membership of thirty-eight. All of the old members, except one, have completed gas jobs and they are looking forward to their first big contest to be held on May 15. (At the time of this writing it has not taken place.) The only event will be limited engine run duration. A complete course in flying is offered to the winner by Dick Reid and Gene Schultz of Western Airlines, Inc. It appears that they do things "in a big way" out in Yakima, for on the evening before the contest a banquet has been arranged for all model aircraft builders of the city and others interested in aviation. All the gas models and trophies will be displayed at the banquet. The success of these activities is largely due to the Republic Publishing Company of Yakima, who has given them much publicity and has donated a large list of prizes.

Picture No. 12 shows a snappy looking racing job built by Claud Woodworth. It is composed of 397 parts and has a five foot wingspread, powered with an inverted Baby Cyclone engine. This ship is not only beautifully constructed but the general design should be perfect from a stability and efficiency standpoint.

Mr. Robert Megorden also writes that he has test hopped his scale Corbin gas job, powered with a Brown Junior. He thought he would be safe in tying a string to the tail skid and pulling it down when he felt the model was getting away from him. However it appears that the string slipped and the ship, string and all, climbed to 2000 feet before it started back to "mother earth." It glided down beautifully except for the fact that it landed in a tall tree and then started to fall through the branches. However about seven feet from the ground it suddenly stopped falling. The string on the tail caught one of the branches and saved the day. In spite of all this no damage was done. The flight lasted for twenty-three minutes on a third of a tank of gas.

Washington, D.C.

Robert Little of 924 Longfellow Street, N.W., Washington, D.C., secretary of Unit 31, writes as follows:

"An interesting thing happened to me a short while ago. On February 8th I lost my second gas model. I hunted for it for several days but was unable to locate it and I heard nothing about it until two months, nine days later, on April 17th.

"Then I heard a man had found it in his front yard on February 8th but was unable to return it because I had no name or address on it. When I located the man I got the model back and found he had made some necessary repairs for me."

Unit 31 now has thirty-one members.

California

The Gas Model Airplane Association of Southern California, Unit 23, is promoting its second gas model contest on June 13th, 1937. A large crowd is expected, if we are to judge from the fact that 3,000 copies of their program are being printed.

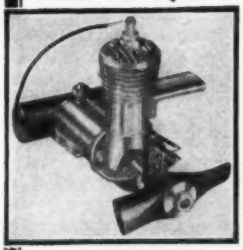
Australia

Mr. Ivor Freshman of 67 Liverpool Street, Sydney, Australia, secretary of the Model Flying Club of Australia, which is Unit 13 of the I.G.M.A.A. sends us news of their activities. He says:

"Last week the Model Flying Club was presented with a magnificent silver trophy by Mr. Cyril Westcott, who represented the donor of the trophy, Viscount Wakefield of Hythe. This trophy is for com-

HEADQUARTERS FOR MOTORS and GAS MODEL KITS!

TWO FREE PROPELLERS WITH EVERY ASSEMBLED MOTOR—HANDY MODELER'S KNIFE FREE WITH EVERY MOTOR KIT OR GAS MODEL KIT!



1937 GWIN AERO

The "BRAT"—sensational small-motor—1/10 H.P.—weighs only 3 1/3 oz. For 3 ft. to 4 ft. models—saves most of expense and time in building your gas model. No large, clumsy model to transport. The "BRAT"—complete with coil, condenser, tank, propeller tested and ready to mount in your ship.....$16.50 POSTPAID

(See April, May, June issues of M. A. N. for photo and further details.)

1937 Mighty Midget Motor	$16.50
1937 Inverted Mighty Midget	17.25
1937 Gwin Aero—With Exhaust Stack, Finned Head	17.50
1937 Gwin Aero, Inverted	18.25
1937 Brown Jr. Motor	21.50
1937 Baby Cyclone Motor	17.25
1937 Ohlsson Motor	18.50

Remember!—You Get a Free Propeller With Every Motor

MOTOR KITS

1937 Mighty Midget Motor Kit	$ 9.85
1937 Mighty Midget Kit—Inverted	10.10
1937 Gwin Aero Motor Kit	11.35
1937 Gwin Aero Kit—Inverted	11.60

Remember—You Get a Handy Model-Makers' Knife Free With Every Motor Kit!

We Stock the Following Gas Model Kits for Immediate Delivery:

C-D Rearwin Speedster—
64½" span—$4.85 postpaid (with airwheels—$6.10)

C-D Stinson Reliant—
82" span—$8.50 postpaid (with airwheels—$9.75)

Lindberg Rearwin Speedster—
6 ft. span—$7.00 (plus 50c shipping)

Lindberg Berliner Joyce—
5 ft. span—$6.75 (plus 50c shipping)

Lindberg Silver Flyer—
6 ft. span—$5.00 (plus 35c shipping)

Comet Curtiss Robin—
6 ft. span—$4.95—(plus 50c shipping)—with wheels—$6.50 (plus 50c)

Denny Jr.—6 ft. Span—
Complete Kit—$10.00 postpaid



C-D Rearwin Speedster

Here Are Real Money-Saving Specials!

C-D REARWIN KIT AND GWIN AERO MOTOR—only $21.50 postpaid

C-D STINSON KIT AND GWIN AERO MOTOR—only $24.50 postpaid

LINDBERG REARWIN KIT AND GWIN MOTOR—only $24.00 postpaid

LINDBERG BERLINER JOYCE KIT AND GWIN MOTOR—only $23.75 postpaid.

LINDBERG SILVER FLYER KIT AND GWIN MOTOR—only $21.50 postpaid

COMET CURTISS ROBIN KIT AND GWIN MOTOR—only $22.50 (with wheels)

DENNY JR. AND GWIN AERO MOTOR—only $25.00 postpaid

ANY OF ABOVE WITH MIGHTY MIDGET MOTOR—$1.00 less than with Gwin.

—Figure Your Savings!—Order Now!—

Send 3c stamp for catalogue of gas model kits, motors, supplies

CALIFORNIA BUYERS!—PLEASE ADD SALES TAX.

JAY'S MODEL SHOP—7763 Melrose Ave. (Dept. M-11)—Los Angeles, Calif.

petition throughout Australia with petrol-driven models."

Mr. Freshmen is still hoping that the United States sends a team of model builders to the International Championships to be held in Australia in March, 1938. Those who may be interested in participating in this Australian contest should write to the editor of MODEL AIRPLANE NEWS.

Ohio

Mr. Charles Tracy, Aviation editor of the "News-Bee," Toledo, Ohio, is head of unit 32. He is very active in the gas model field. A contest was held on April 11th and several more are being planned. The contest was sanctioned by the I.G.M.A.A. and run under its rules. Up to the present time we have received no report of the details but hope to present them in the next issue. We did hear, however, that Mr. Tracy showed the spectators "a thing or two." He made thirty flights with his ship with a single crack-up due to misadjustment or instability. This is what we call a record!

Findlay, Ohio

At a recent meeting of the local gas model unit an election was held which resulted in the election of the following officers under the able leadership of Mr. A. B. Fruchey:

President—Richard Jaqua.
Vice President—Robert Rice.
Secretary—Robert Chatelain.

Since the loss of Robert Jeffery's 6' 10" Cyclone powered job the Unit has but one gas job in flying condition—a 10' K. G. Cabin. However, there are at least six jobs nearing completion as this is written. Among these are two monocoque jobs. One is an 8' span to be powered with a Baby Cyclone which is being designed and built by Bob Chatelain. The other is a 9' Tlush-powered outfit by Bob Jeffery. Richard Jaqua's enlarged T-D Coupe boasting a Forster motor will be in the air within a month and Richard Bishop's revamped "Buccaneer" will be ready before then. Mr. Fruchey is busy at work an an original 9' Forster-powered ship and the Rice brothers, Harold and Bob, have completed plans for a 7' Gwin-powered stream-line model.

As soon as we can get some of the completed parts together with a good camera we will present some "shots" of gas jobs that will give you some idea of our ideas and their results.

New Jersey

John Czajkowski of 12 Arlington Avenue, South River, New Jersey, is secretary of Unit 8, the South River High School Model Aero Club. He says:

"I recently made tests with a one-bladed propeller used on a Brown Junior and it was a noble experiment which worked stupendously. The motor ran smoother and a greater amount of thrust was obtained.

"Our unit has received a challenge from the Slate City Gas Model Association of Bangor, Pa., to have an inter-unit gas model contest. We have accepted and it will probably be held the latter part of May. We believe this will be the first contest of this type to be held in which I.G.M.A.A. rules are used."

New York

Mr. Fred Smith, secretary of the Buffalo Gas Modelers, writes:

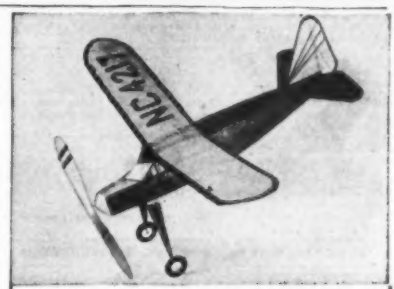
"We have thirty members in our club and have prospects of many more joining. We have the Junior Aviators of the Buffalo 'Times' and Sky Climbers cooperating with us so we will have a guiding hand."

The Buffalo unit is a new unit and is progressing nicely. Charles Thomas is president and Fred Smith, secretary.

Unit 7, the Metropolitan Model League, started off its season with a meeting of its members on Friday evening, April 23rd, and a subsequent contest on May 1st, at Hadley Field, N.J. The contest was conducted under the forty-second motor run rule. The best time was 4.01 minutes, made by Earl Dougherty of Brooklyn, N.Y.

Ohio

On Sunday, July 25th (the 26th if it rains), the Advanced Model Aviation Society and the "Columbus Citizen" newspaper are sponsoring a gas model contest to be known as the Scioto Valley Gas Model



The 1937 WEST WIND

"We have engineered this model to give you all weather performance in a ship that is easy to build, modern in design, and in a complete kit." When strong breezes have grounded other models, stable 24" wing span West Winds are swiftly spiraling skyward, then lazily riding air currents.

For all weather flying model performance ask your dealer for a Monarch Kit.

West Wind kit. $1.00 Postpaid.
Combat kit 50c plus 10c postage.

MONARCH MODEL AIRCRAFT CO.
15311 Antioch St., Pacific Palisades, California



FRONTIER
45 calibre
MODEL $1.45

Colt single action army revolver FRONTIER model kit with machined cylinder, rod ejector and four and three quarter inch barrel.....$1.45
Above with five and one half inch barrel..... 1.55
Above with seven and one half inch barrel..... 1.70
Half scale Thompson Sub Machine Gun model kit.. 1.00
Full scale Thompson Sub Machine Gun model kit.. 3.00
Full scale Colt cal. .45 automatic pistol kit..... 1.00
Full scale Colt cal. .25 automatic pistol kit..... .50
Savage calibre 32 auto. pistol with mach. barrel .75
Luger 9 M/M auto. pistol w/four in. mach. barrel 1.75
Same as above with six inch machined barrel..... 1.90

These beautiful kits are complete in every detail and made of the best basswood. All parts are cut to shape and require only a short time to finish.

They are to be made for display purposes and you will be more than proud to show them to everyone.

Genuine Leather Holster for Colt .25..... 40c
Genuine Leather Holster for Colt .45..... 70c
Genuine Leather Holster for Savage .32..... 45c
Genuine Leather Holster for Frontier 5½"..... 80c
Genuine Leather Holster for Frontier 7..... 85c
Genuine Leather Holster for Luger..... 85c

FREE HOLSTER for any one of the above pistols or revolvers, with order for $2.00 or more.

Postpaid in U.S.

Send for FREE illustrated circular.

GUN MODEL CO., Dept. E-27, 2908 N. Nordica Ave., Chicago, Ill.

CLASSIFIED DIRECTORY

Advertise in this directory for quick profitable results! Rate 10c per word. Minimum 20 words. REMITTANCES MUST ACCOMPANY ALL ADS FOR THIS DIRECTORY. Advertisements for the Aug. issue must be in by June 10th.

MODEL AIRPLANES—KITS—SUPPLIES

EFFICIENCY. Visibility & Strength gained with our special Red Glider Polish. Large 3 oz. can only 30c P.P. Midwest Model Supply, 437-G W. 69th St., Chicago, Ill.

DEALERS. Clubs, Schools: Send for low, complete wholesale list, including gas model supplies. Save money. Model Airplane Utility, 5307 New Utrecht Ave., Brooklyn, N. Y.

GAS Motors—$5 up. Highest allowance for your old motor on new or used motors. Send stamp. Carl A. K. Eldredge, Jr., Haddonfield, N. J.

BARGAINS Galore. Quality Supplies at unequaled prices. Send for our catalogue and free offer. Aircraft Distributing Company, 113 Blake Ave., Brooklyn, N. Y.

WORLD'S finest scale models, rubber and gas driven. Send 10c for 1937 large catalogue. Miniature Aircraft Corp., 83 Low Terrace, New Brighton, New York.

AGAIN We Extend a cordial invitation to visit Chicago's largest complete Model Airplane-Boat Shop. Inspect the large stock of kits, motors and supplies. Southside's greatest stock of stamps and coins for collectors. Merchants, sell Silent Salesmen Boards. Well displayed, easy to sell. Three different boards, 5 and 10c sellers, retails $6.95—only $4.00. All-Nation Hobby Shop, 1209½ E. 55th St., Chicago.

CLEVELAND Kits and Supplies, Catalogues, 10c. New Cleveland Gas Model Kits now on hand for Immediate Delivery. Also Gas Motors and Motor Kits. Pikes Peak Model Supply, 310½ E. Pikes Peak Ave., Colorado Springs, Colorado.

CONTESTANTS: Get our Special Outdoor Beam Scale. Weighs Accurately from .001 to 10 ounces. Each scale balanced and checked. Complete with weights, only $1.25 P.P. Midwest Model Supply, 437-G W. 69th St., Chicago, Ill.

WHOLESALE Only. Dealers don't delay. Catalogue of unequaled prices sent free on request. Capitol Wholesale Supplies, 113 Blake Ave., Dept. A-6, Brooklyn, N. Y.

RUBBER Thread. Hodgman Rubber Company, 261 Fifth Avenue, New York City. Chicago Office: 412 South Wells Street. Dealers and Manufacturers only.

ATTENTION Model Builders. Our free price list will please you. Write, Waterbury Model Builders Supply, 131 Cherry St., Waterbury, Conn.

SCALE Models of Historical Buildings. Complete Kits, full color. New easy method construction; no carving, no painting. Particulars free. Letter Shop, Park Ridge, Ill.

SPECIAL Introductory Offer—Gas Model Cement, Dope, or thinner, 50c pint. Colored Dopes 75c pint Postpaid. List Free. Wholesale Model Aircraft Service, 103 East 95th Street, Brooklyn, New York.

CAMERAS, PHOTO SUPPLIES, PHOTOGRAPHS

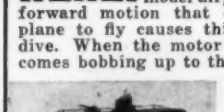
CAMERAS and supplies. Free illustrated catalog listing everything photographic—still and movie cameras, films, lenses—at tremendous savings. Hundreds of bargains, new and used. All guaranteed. We take your old camera or equipment in trade. Write now for your free copy of our newest money-saving bargain book—just out! Limited edition. Hurry! Central Camera Co., (Photographic Headquarters since 1899), 230 South Wabash, Dept. 7-MA, Chicago.

MODEL Builders, begin your next scale model right—by using our beautifully detailed photographs of the prototype for reference. Send ten cents today for sample. Anderson-Klatt, Lindbergh Field, San Diego, Calif.

MAGIC

BE A Magician. Professional Catalog of Outfits, Tricks and Books 25c. Holden Magic Co., F-220 W. 42nd St., N.Y.

HERE! is something new for you fellas who build flying model airplanes. The same forward motion that causes the airplane to fly causes this submarine to dive. When the motor is exhausted it comes bobbing up to the surface again.



SCALE MODEL Submarine S-50

19" lg. with adjustable fins, water ballast chamber and air valve control for diving. Runs on surface or under water. Die cast conning tower, naval gun and keel parts. Brass propeller and trim. S-50 Submarine Kit (54 completely machined parts ready to assemble).....$1.75 P.P.
13" Kit (40 parts ready to assemble).....$1.00 P.P.

Aluminum Parts Kits for Solid or Flying Kits

1 - 2¼" dia. motor cowling
1 - 1¼" dia. motor ventilator
1 - 4½" die-cast 2 blade prop.
2 - 1-3/16" dia. rubber tired wheels.

80c value all for 49c P.P. Add 10c for 2¼" dia. 9 cyl. cast aluminum motor. Send for free catalog of other models.



WESTLAKE MODEL CO.
Dept. M70, Erie, Pa.

Contest. There will be two events, one will be a duration event with 1/16 oz. gas allowance per pound of weight; the other a duration event with an engine run of forty seconds. Already several entries have been scheduled from Pittsburgh (with Bob Allen), Indianapolis and Akron. More cities are expected to come in soon.

The Club officers for the coming year are: president, Edward Lorenz; vice-presibent, Carl Horst; secretary, George Ginns and treasurer, Bob File.

It looks as if Bob was in the money at last.

Some of the new units in the Association are:

A second unit, No. 75, has been formed in Omaha, Nebraska, under the sponsorship of Karl N. McMullen of 2530 North 75th Street.

T. J. Holmes of 756 Colorado Blvd., Denver, Colorado, is vice-president of the newly formed Rocky Mountain Gas Model Unit, No. 72.

Unit No. 73 is the Muskogee Gas Model Club of 625 Fondulac, Muskogee, Oklahoma, of which Frank McAfee is secretary and treasurer.

Armand Love is secretary and treasurer of Unit 74, the Garden State Gas Model Club of 12 Beech Street, Belleville, New Jersey.

The Y.M.C.A. is sponsoring Unit 76, which is also the Junior N.A.A. Chapter of Chattanooga, Tennessee. James E. Smith of 1605 Vance Avenue, Chattanooga, is president.

NOTICES

Contestants who intend to enter the "Red Zephyr" model in the Nationals or other contests using the National Aeronautic Association rules should know that the fuselage must be shortened about 1¼ inches if the ship is to conform to the rule that the body cross section should be equal to $\frac{L^2}{100}$. If they do not wish to shorten the body, the girth of the body may be enlarged approximately ½ inch on all four sides.

The International Gas Model Airplane Association wishes to announce the appointment of Mr. John Bartholomew, supervisor of the Kresge Department Store unit of Newark, New Jersey, as the New Jersey State Director. All gas model fliers in New Jersey should keep in close touch with Mr. Bartholomew for news of future developments.

When writing to the head office of the I.G.M.A.A., all units are requested to have their correspondence carry their unit number.

During the delivery of an order of Brown Junior Motors to Mr. E. B. Miller, Comet Model Airplane & Supply Company, 688 Broadway, New York City, the Brown Junior Motor No. B3414 was lost or stolen. Anyone having a record of this motor will please notify the headquarters of the I.G.M.A.A., 551 Fifth Avenue, New York City. Contest directors and Association members are kindly requested to keep on the watch for this number on any motors that they come in contact with.

Inter-Unit Contests

Several units are planning inter-unit contests. This is a fine idea and we hope others throughout the country will get together and test their skill in this way. Sanctions may be obtained for such contests by writing the I.G.M.A.A. at 551 Fifth Avenue, New York City, well in advance of the contest date.

The I.G.M.A.A. now has over 2,800 members and 76 official units enrolled.

Duration Trophy

Attention is called to the fact that the duration trophy now held by Maxwell Bassett of Philadelphia, Pa., which he won with a flight of twenty-three minutes, eighteen seconds, may be competed for by any member of the I.G.M.A.A. in a meet officially sanctioned by the Association.

Designing Your Model for Duration

(Continued from page 17)

of the April 1935 issue of MODEL AIRPLANE NEWS.) Any high cambered section with a slightly concave undersurface and a high L/D ratio (about 20 or more) will prove to be suitable.

Suppose we choose the G-3 section for our plane. This should be used throughout the span of the wing to within six inches of each tip. From these points to the tips of the wing the section should be slightly modified. The camber should be reduced progressively at each rib point, so that a point about one inch from the tip the camber is about 1/10 the chord.

Position of the Wing

Before the proper amount of dihedral angle can be given to the wing, it is necessary to locate it relative to the fuselage. Is it best to make the duration model a low-wing, a high-wing or a parasol wing type? Of these three types the "Parasol" affords the greatest longitudinal, lateral and spiral stability. It also induces excellent climbing qualities, because the high resistance causes the necessary nosing up effect under "speed" instead of the tail depression and consequent nosing up effect caused by a negative stabilizer. In the case of the parasol type of model, a positive or lifting stabilizer may be used. This gives greater buoyancy and insures greater duration. It is obvious therefore that the parasol type of tractor is best for a duration plane.

Angle of Incidence

Because of the parasol arrangement, it is not necessary to give the wing very much dihedral angle. If in this type of plane each wing tip is raised one inch for every foot of span, it will be sufficient to give excellent lateral stability. As the span is to be 46 inches, each wing tip should be raised (3-5/6 x 1) inches or (3.83) inches.

Force Arrangement

Before you can proceed further with the layout of the proportions of your model it is best to make a force arrangement diagram. In fact this may be done before the wing proportions are determined if you desire.

The base line or reference line for the force layout is the line of flight, which is in effect the thrust line. After drawing this horizontally on the paper you are using for your force diagram, mark the point on this line over which the center of the wing will

be. The next problem is to determine how far the tail planes will be from this point. One of the requirements of your large weight rule duration plane is a long powerful motor, for as much weight as possible should be in the rubber motor. Therefore it is well to make the fuselage quite long, even though the small chord makes it possible to use a tail moment arm which is shorter than one-half the wing span. The moment arm should be equal to about one-half the wing span, or 23 inches.

Scale off 23 inches to the right of the first point along the thrust line and draw a mark across the thrust line at this point. The center of the stabilizer and fin should be located here, 23 inches from the center point of the wing.

The next consideration is to establish the point at which you wish the center of gravity to be located. In order to secure a "nosing up" tendency when the plane is gliding and a resulting flat glide, the center of gravity should be *below* the thrust line.

It is usually very difficult in the case of this type of model, the landing gear of which is usually quite light, to build the plane so the center of gravity is actually located very far below the thrust line when the plane is completed. However, no difficulty should be experienced in designing the ship so the C.G. is ½ inch below the line of thrust. This is 1/46 of the moment arm. Mark in (CG) this distance below the thrust line shown on your drawing and directly under the point marking the position of the center of the wing chord.

Now the wing chord may be drawn in. In parasol models of this type the wing chord should be located about (⅛) the tail moment arm above the line of thrust. Then in this case the chord should be placed three inches above the thrust line.

Angle of Incidence

Before the wing chord can be drawn in it will be necessary to determine what the angle of incidence of the wing will be. On high cambered wings less angle of incidence may be used than in the case of thin wings. However as much "incidence" should be used as possible and yet have the wing act efficiently, because a slow flight speed is desired and the higher the angle of incidence the slower the plane will fly. Too much angle however will cause a low-wing efficiency on the climb. Therefore as the maximum L/D is reached at about six degrees angle of attack a normal angle of incidence of three degrees will produce an angle of attack when the plane is climbing of about six degrees. Thus the highest wing efficiency will result when the ship is climbing.

The wing chord line, therefore, should be drawn in on your force diagram *three inches* above the line of thrust and at an angle of three degrees positive to the line of flight or thrust line. The chord line should slant upward to the left to indicate a positive angle. Around this chord line draw the wing section with its center over the C.G. Then draw in the side elevation of the wing showing the correct amount of dihedral.

Next the body outline should be drawn in. However before this can be done with accuracy it will be necessary to know how deep and how wide the body must be in order that the largest cross section area will be equal to $\frac{L^2}{100}$, where (L) is the length of the model exclusive of the propeller.

The distance from the center of the wing to the center of the stabilizer is 23 inches. The distance from the center of the wing to the nose of this type of model is usually about 60 per cent of the tail moment arm; 60% of 23 inches is 14 inches. Therefore the nose will be 14 inches long. The fuselage at the rear will extend out past the center of the stabilizer about 3 inches. So the total length of the plane (less the propeller) will be (23+14+3) or 40 inches.

By placing this value of (L) in the formula and solving you will find that the required maximum fuselage cross section area will be 16 square inches.

Inasmuch as the duration model must have the lowest possible drag, an elliptical fuselage cross section should be used. A hollowed out monocoque body is advisable. If the body is made with such a cross section it may be 6 inches deep and 3¾ inches wide. This will provide the necessary cross section area.

Thus we see that the maximum depth of the body should be 6 inches. The bottom outline of the fuselage should extend down below the line of thrust as far as possible in order to be assured of a low center of lateral area. A good proportion for the dis-

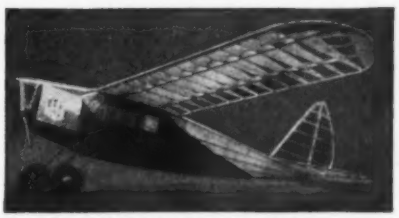
THE WINNER! of our first April month contest, who received a BROWN, jr. MOTOR was G. C. Williams, 3421 East 25th St., Bryan, Texas.

We received hundreds of entries and excellent ideas and excellent suggestions. Our only regret is that we cannot give out hundreds of prizes. However, try again—at this new contest, lots of use and luck with his prize. Happy landings.

New Contest *Name This Plane*

$100.00 IN PRIZES

Everybody get into this new simple contest. You can win one of the many prizes. Here's all you have to do:



We have perfected a sensational new model plane kit—a 20th Century flying wonder—streamlined—far-flying—durable and detailed. ASSEMBLES IN A JIFFY. Beats all other planes a mile. WE WANT YOU TO NAME THIS NEW AMAZING PLANE. WE WILL PAY $100 in prizes to the lucky winners.

1st Prize—A BROWN, Jr. Motor ($21.50 value)
2nd to 10th Prizes—A Pair of 3½" Gas Model Pneumatic air Wheels
11th to 20th Prizes....$1.00 worth of Supplies—Your Choice

JUDGES
1. Editor of Model Airplane News.
2. MITCHELL ROBERTS, Pres. of Heathe Co.
3. MICHAEL ENTRIN, of the Advertising Agency.

SIMPLE RULES
1. Each entry must be accompanied by a minimum order of $1.00. Send as many entries as you like, as long as each has $1.00 order. 2. All entries must be mailed not later than midnight, September 10th. THE WINNER WILL BE ANNOUNCED IN THE OCTOBER ISSUE OF MODEL AIRPLANE NEWS.

SAMPLE ENTRIES
ZEPHYR, SQUADRON, LIGHTNING, STORM KING, CYCLONE, BLUE BOY, TROPS, SPIRIT OF BOYHOOD, etc.

EVERYBODY WINS BUYING MODEL SUPPLIES & KITS AT HEATHE
Not only do you get finest quality supplies at rock-bottom prices—but also a chance to win one of the many desirable prizes. Send your orders right from this listing and send your entry along with it.

Lumber Gas Models—All Five Foot Lengths
The following wood can be had in **Spruce, Bass,** or **Balsa** at the Same Prices as those listed below.

⅛x⅛	$ .03
⅛x⅛	.03
⅛x⅛	.07
3/16x3/16	.04
3/16x¼	.05
3/16x⅛	.07
3/16x1	.08
¼x¼	.03
¼x⅛	.06
¼x1	.10
⅜x⅜	.09
½x½	.10
½x1	.18
1x1	.25

Sheet Balsa (Special for Gas Models)
36" Lengths

1/16x2	.04
1/16x3	.06
3/32x2	.05
3/32x3	.09
⅛x2	.05
⅛x3	.09
3/16x2	.07
3/16x3	.11
¼x2	.09
¼x3	.13
⅜x2	.10
½x3	.30

For Five Foot Lengths in Sheet Balsa. Double Three Foot Length price.

Reed
⅛, 3 ft. for .05
3/16, 3 ft for .07

Birch Dowels 36" lengths

3/16 dia.	.04
¼ dia.	.05

Spun Aluminum Wheels
5" dia. per pair only $1.50

Gas Model Wheels
Special pneumatic wheels good for gas model from 3' to 8'. Size 3½". Price pair $1.50

Carved Props for any Motor, each only $1.00

Shaped Propeller Blanks
Specify size of prop & Motor, each only 25c

Toggle (On-Off) Switches, 45c

Miniature Knife Switches
2 poles.....25c each
3 poles.....35c each

Cement & Dopes
These liquids are specially made for gas powered models and should not be confused with those used for rubber powered models.

4 oz.	.18
1 pt.	.60
1 qt.	1.00

Gas Model dope and paper adhesive same price as cement.

Spring Steel Wire
(In five, 5-foot lengths.)

1/16 dia. 5'	.05
3/32 dia. 5'	.15
⅛ dia. 5'	.25

Dural Angle Beam

⅛"x⅛" foot	.20
¼"x¼" foot	.30

Sheet Celluloid
12x16 sheet ..... .18

Colored Dope All Colors
4 oz. ..... .20
1 pt. ..... .65

Aluminum Tubing
1/16 dia. ft. ..... .08

3/32 dia. ft.	.09
⅛ dia. ft.	.10
3/16 dia. ft.	.11
¼ dia. ft.	.12

Sheet Aluminum

1/32" 6"x6"	.15
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tances from the thrust line to the top of the fuselage and from the thrust line to the bottom of the body is 30% and 60%. In this case where the body is 6 inches deep, the distance of the top of the fuselage above the thrust line would be about 1¾ inches. Thus the bottom of the body would be 4¼ inches below the line of thrust.

Having established these points and the length of the body, the fuselage outline may be drawn. Fig. No. 127 gives an example of a well streamlined fuselage of the correct proportions. The means used to attach the wings to the fuselage is a matter of structural design not aerodynamic design. However, Fig. No. 127 shows how a neat streamline fillet may be made. Wire struts will also serve the purpose well, as they will produce very little resistance.

The next step in the procedure of design is the most important one of all. It is the designing of the propeller. Upon this the performance of your model largely depends, so brace yourself for the next article of this series, to appear in the August issue of MODEL AIRPLANE NEWS. Complete details of the procedure of design of this and other parts of the *duration* model will be given.

Air Ways Here and There

(Continued from page 57)

club in Cincinnati, Ohio, called the Albatross Birdmen. The purpose of the club is to promote aviation in all its forms. They are particularly interested in model work as they feel it prepares young men to handle large ships carefully and well when they graduate into the big plane field. Mr. Richards Kispert is president of the organization. Mr. Charles Price has been active in organizing the model airplane club and has been particularly interested in developing safety in flying.

Model builders who live in the vicinity of Cincinnati are invited to join this club. They should contact Mr. Charles A. Price at 818 Wade Street, Cincinnati, Ohio.

Staten Island, New York

One of the new units of the Air Ways Club is the Richmond Hill Flying Club, of 463 Willowbrook Road, Port Richmond, New York. Bill Mott is president and Lawrence Emil Kissel is secretary, to whom we are indebted for this news. The club has been in existence for fourteen months and is the only club in Staten Island. To date it has held two series of contests. The first was won by Lawrence Eisinger, who received as first prize a round trip ticket to the 1936 "Nationals". The autumn series was won by Martin Rohnes. He received a Brown Junior engine.

Picture No. 12 shows Rohnes' seaplane on an official flight during the contest last autumn. This is indeed an exceptional shot of a plane in flight; not only is the picture clear but the flight is official. The picture was taken with a box camera. The average attendance at the club meetings is about twenty-five members, who are most anxious to contact other model builders in their vicinity, with the thought that interclub contests might be arranged.

One of the unusual incidents during an autumn contest was a flight of six minutes 15 seconls y an all-balsa glider made by Magnus Anderson.

Notice

MODEL AIRPLANE NEWS wishes to thank "Model Aviation" for telling their readers of the I.G.M.A.A. gasoline powered contest which is to be held at Hadley Field, N.J., on May 22nd.

AIR WAYS CLUB DESIGN CONTEST NO. 3

Speed Model

Air Ways Club members no doubt have been waiting patiently for the third design contest to be announced. The problem in this contest is to design a speed ship, particularly for racing. This is a comparatively new field of endeavor for many builders and provides a chance to express originality to a high degree. To those who wish to understand some of the principles involved in building speed models we suggest that they read the articles on speed models, written by Mr. Grant, and published in the December 1936, January, February and March 1937 issues of MODEL AIRPLANE NEWS. In the April issue a complete plan for a speed model is given on page No. 6.

Often one of the mistakes that builders make in designing speed models is that they make them too heavy. Contrary to what you think, a speed model should be comparatively light

The rules governing the contest are as follows:

The plans should be on one page within a border of seven by fourteen inches. All parts necessary to build a model should b shown according to a scale which is of your own choosing. Plans should be submitted in ink. They will be judged on the following points:

1. The design characteristics of the model.
2. The character of the construction of the model.
3. The manner in which the plans are laid out on the page in respect to their clarity of meaning; that is, the ease with which the person building the plane may understand the plans.
4. The neatness of the drawing.

All plans will be judged on the basis of these four qualifications. The decision of the judges will be final.

The prizes are: $20 for first place; $12 for second; $7 for third; $3 for fourth and for fifth through tenth place $2.

The contest is open to all Air Ways Club members in good standing. When submitting your entry be sure to put your membership number on the drawing. All entries must reach this office by midnight of July 21st, 1937.

This project should prove a very interesting job to many builders and will take them into a new field of work. We hope that all Air Ways Club members will try their hand and their designing ability by sending in an entry. Though you may not win a prize you will gain valuable experience from your work. Good luck!

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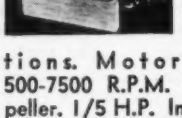


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shown on opposite page



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Specifications

MODEL—Curtiss Robin.
WING SPAN—6 ft.
OVERALL LENGTH—46 in.
WEIGHT OF MODEL—2 lbs. less motor.
POWER—any 1/5th or 1/6th H. P. motor.
WHEELS—3½ in. air wheels.



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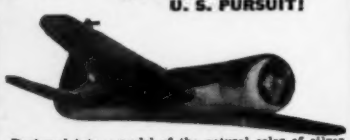
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Hard to tell this actual 20" model photo from ¾" model. Full of typical C-D authentic featur and details. Speedy flights. Dry Kit R-21, (no liquids) only..... **6**



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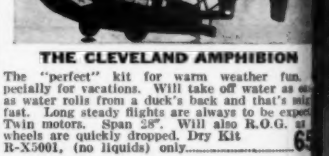
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